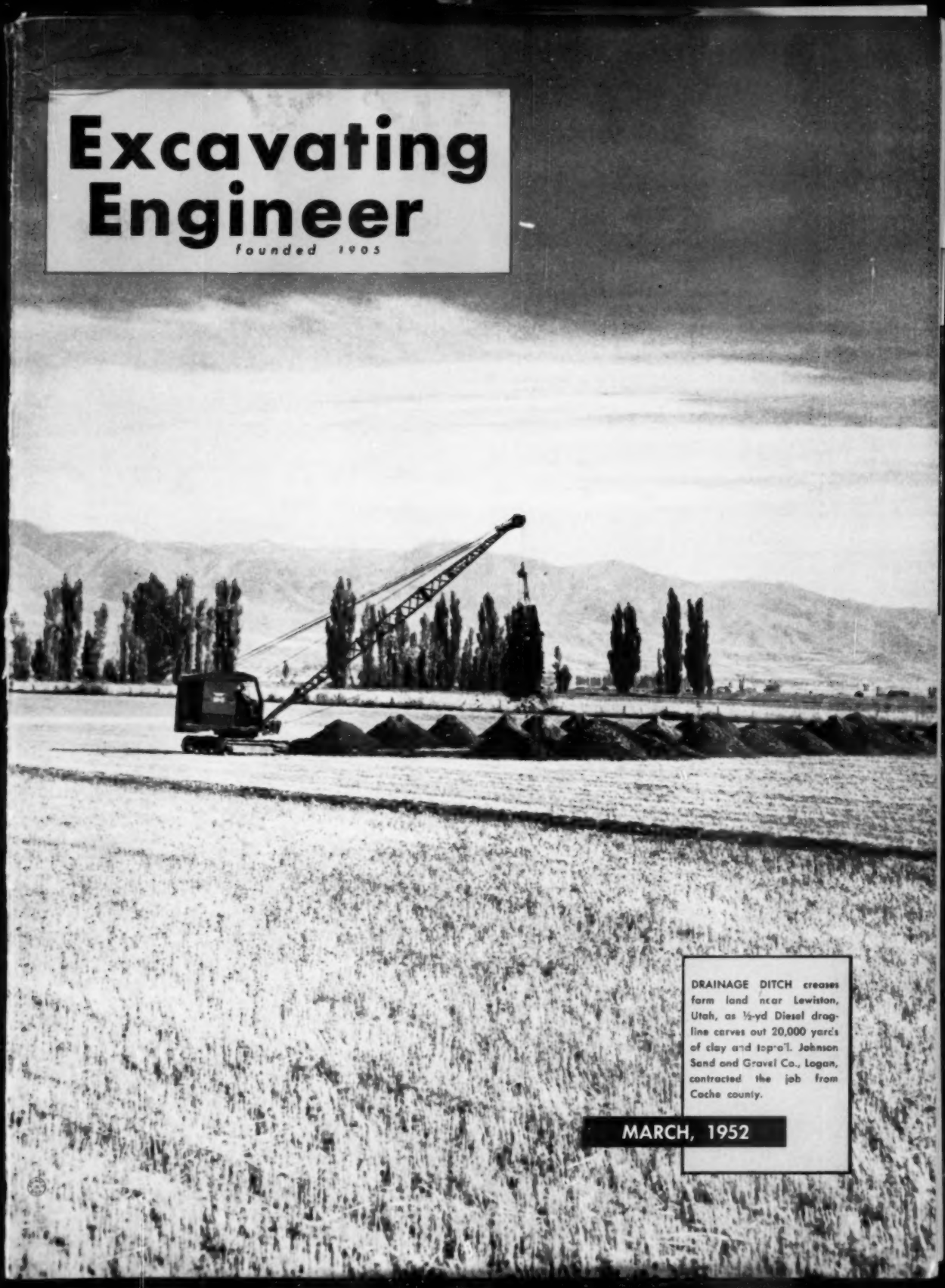
Excavating Engineer

founded 1905



DRAINAGE DITCH creases farm land near Lewiston, Utah, as ½-yd Diesel dragline carves out 20,000 yards of clay and top-soil. Johnson Sand and Gravel Co., Logan, contracted the job from Cache county.

MARCH, 1952

BUCYRUS ERIE

6-YARD

150-B

Brings NEW SPEED, POWER, CAPACITY

To Heavy Duty Excavating

ADDED to the time-proved superiorities of design and construction which have made Bucyrus-Erie quarry and mining shovels traditionally "years ahead" are important features new to an excavator of this size, yet *thoroughly proved in the field*. Among these 150-B features are:

Exclusive Two-Section Boom with tubular dipper handle free to rotate in saddle block. Used with outstanding success on Bucyrus-Erie's large stripping shovels for many years, this design speeds the working cycle and permits increasing the payload because it reduces front end weight materially — yet provides enormous strength. Upper boom section carries only load resulting from pull of ropes, strong trussed lower section transmits directly to the revolving frame the vibrations, torsional and shock loads set up in digging. Rope crowd is quiet, positive, with crowd machinery located on the deck.

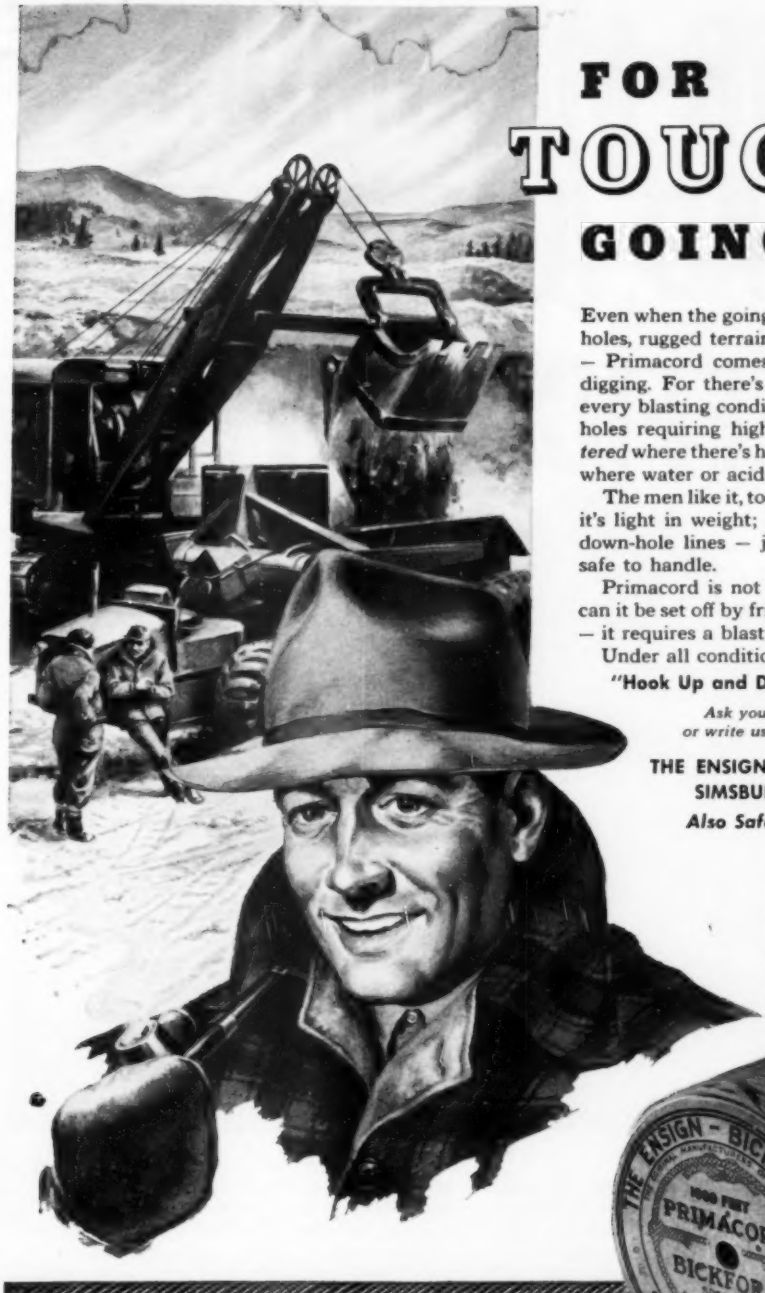
Powerful New Main Machinery designed for double twin hoist, smoothly delivers power where you want it, when you want it. Hoist machinery pulls dipper straight through tough banks with steady positive action. Fast smooth swing, with quick acceleration and deceleration, shaves seconds off every cycle.

Larger Stronger Mounting has new propelling machinery arrangement, which provides rapid engagement of the propel for fast move ups. Cored box-section tread links have separate wearing paths for rollers and driving tumblers. Cat belts have high wear resistance, stay in adjustment for long periods.

The 150-B has full Ward Leonard independent motor control, is fully convertible to dragline service, features numerous other design advances that make it truly "years ahead". 3152C

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin



FOR TOUGH GOING

Even when the going gets tough—with rough ragged holes, rugged terrain, continuing rains, flooded pits – Primacord comes through with plenty of good digging. For there's a grade of Primacord to meet every blasting condition—*Reinforced* for very deep holes requiring high tensile strength; *Wire Countered* where there's high abrasion; *Plastic Reinforced* where water or acids are present.

The men like it, too. It comes in convenient spools; it's light in weight; easy to hook up for main and down-hole lines – just tie a half hitch – and it's safe to handle.

Primacord is not affected by stray currents nor can it be set off by friction, sparks, or ordinary shock – it requires a blasting cap to detonate it.

Under all conditions it pays to

"Hook Up and Detonate with PRIMACORD"

Ask your explosives supplier
or write us direct for further facts

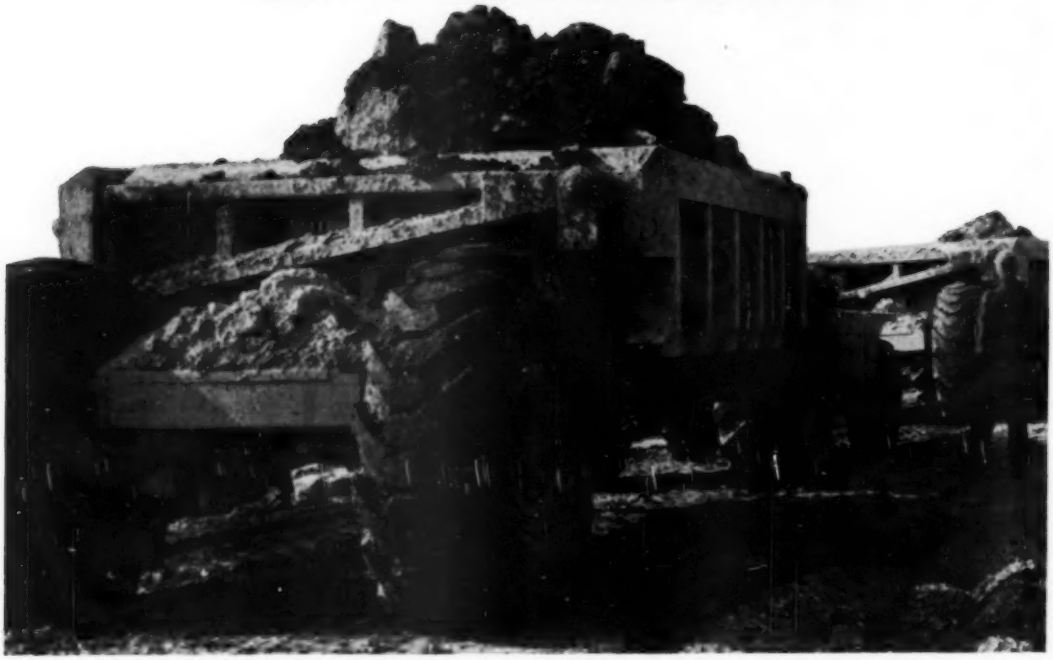
THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT
Also Safety Fuse since 1836

Made in several types. **PLAIN PRIMACORD** for shallow holes and surface trunk lines; **REINFORCED PRIMACORD** for deep holes and resistance to abrasion; **WIRE COUNTERED PRIMACORD** for deep, ragged holes; and **PLASTIC REINFORCED PRIMACORD** for deep, wet holes and river crossings.

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

FOR MAXIMUM ROAD AND LOAD EFFICIENCY!



Above: EASTON TYPE TL lift door side-dump gooseneck trailer, capacities to 32 tons.

RUGGED, rock-ribbed EASTON truck bodies and trailers are used in combination with any modern off-highway truck chassis or tractor. The combination of separate motive unit and container unit engineering, by separate specialists, provides a safe double check on your haulage investment. Any EASTON-approved combination will give you the maximum possible road and load efficiency, even under the most adverse haulage conditions! EASTON builds several different types of truck bodies and trailers for different types of off-highway service in earth, rock and ore. For information, outline your haulage requirements to: **Easton Car & Construction Company, Easton, Pa.**

EASTON SIDE-DUMPS

B-1081

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Excavating Engineer

founded 1905

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What He's Gained by Keeping Records on Wire Rope

This man buys and uses a lot of wire rope. For years he never knew exactly which brand was giving him the best service. Then he realized he'd better find out; it could save him important money.

So now he's keeping records on all his major ropes. He knows the date they go to work, the type of work they do, and just *how much* they do. His records enable him to check on different brands; they show him which make of rope is doing the biggest job per dollar spent. And he's wondering why he didn't adopt the system years ago.

Do you keep records like this? We at Bethlehem encourage the practice, for it's the only real way you can determine a "good buy" in rope. And when Bethlehem rope is involved in any comparisons you make, we naturally feel that it will soon demonstrate its basic soundness, durability, and all-around economy.

In every detail the Bethlehem product is made to the highest standards of quality. If it were not, we'd be foolish to suggest a means of comparison with other brands. But the plain truth is, Bethlehem wire rope will slug it out on any job you have . . . and your own records will prove it!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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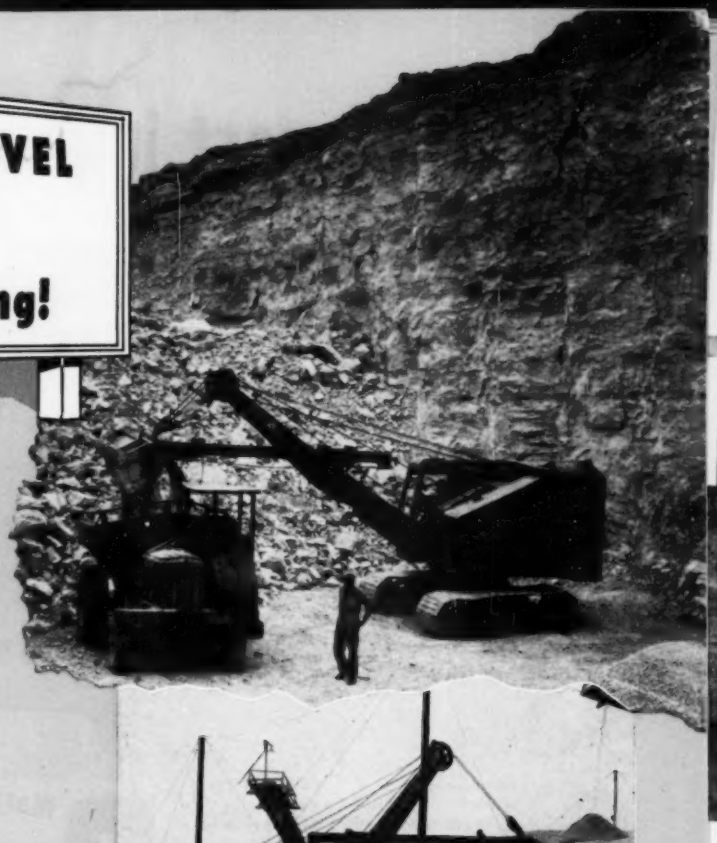
LET YOUR RECORDS TELL YOU!

A GOOD SHOVEL is *GOOD* in *ANY* digging!



TODAY'S job you know about—but, what are you going to hit tomorrow? Perhaps it will be easier digging but perhaps you'll hit rock you didn't expect. If you have a *real* Rock Shovel—a Northwest Rock Shovel—you are ready for any problem. It means real output in rock, and *greater* output in the easy digging. You are ready for any problem from a quarry job to ripping up pavement.

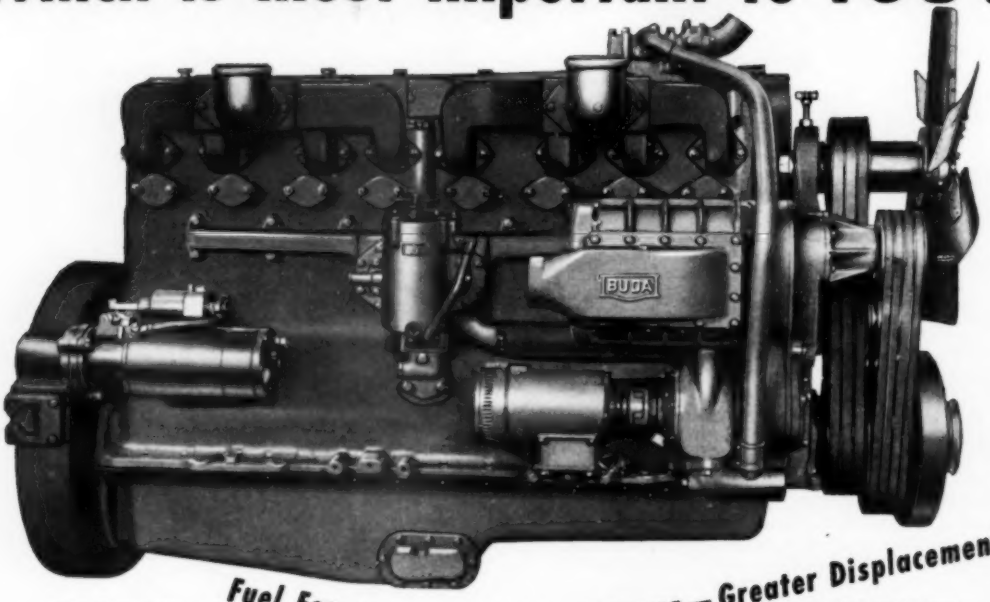
Northwests are built for the tough jobs. Cast Steel Bases and Cast Steel Machinery Side Frames give a foundation that stands the beating of tough "going." The Northwest Dual Independent Crowd utilizes force most other independent crowd shovels waste. The "Feather-Touch" Clutch Control makes handling the big ones easy. Uniform Pressure Swing Clutches give a smooth swing and reduce spotting delays. The Cushion Clutch reduces overloads on parts under power and Northwest Steering reduces maneuvering in changing location. These are real Rock Shovel advantages that mean money. A Good Shovel is Good in *Any* Digging!

NORTHWEST ENGINEERING CO.
1506 Field Bldg., 135 South LaSalle St., Chicago 3, Ill.

NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Which is most important to YOU?



Fuel Economy

Buda dyna-swirl combustion burns *all* the fuel—gives more horsepower hours per gallon

More Power—Greater Displacement

Buda Diesels have 13 to 25% more displacement—more power with greater reserve

Less Maintenance and Downtime

"Clean" design—fewer parts—lower peak pressures...and Simple fuel system means less "nick-nack" maintenance

Greater Lugging Ability... More Torque

You get 10 to 17% more torque at normal speeds—less shifting—faster trips

?

Parts and Service

Buda Parts and Service Facilities close to your operations

Longer Life... More Hours between Overhauls

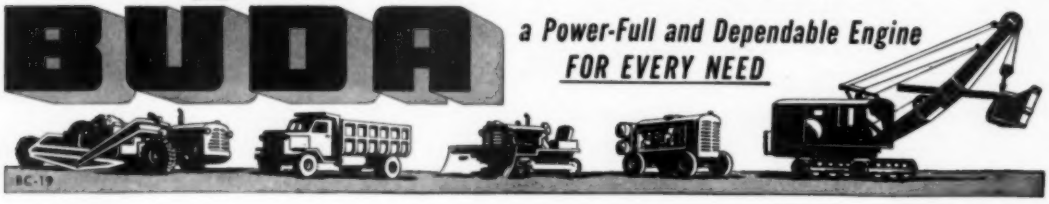
Buda Diesels are averaging more than 6000 hrs. in toughest service

If it means MORE PROFITS... BUDA'S GOT IT!

Any way you figure it . . . the great new line of Buda dyna-swirl Diesels gives you more for your power dollar—more positive advantages that add up to profitable operation.

Get the facts today. They speak for themselves. Ask your nearby Buda Engine Distributor. Write for Bulletin 1526 and complete details. *The Buda Company, Harvey, Illinois.*

BUDA *a Power-Full and Dependable Engine* ***FOR EVERY NEED***



BC-19

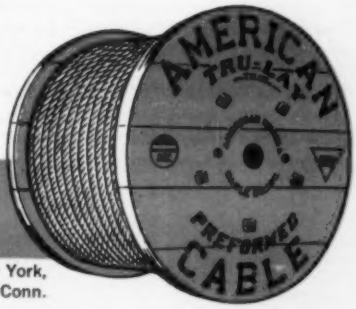
an ACCO product

TRU-LAY Preformed WIRE ROPE

● For each use there is *one best* wire rope . . . one that will stand repeated loading, abrasion, crushing, or continuous bending, and be the best rope to buy.

To achieve this, there is a TRU-LAY Preformed Wire Rope made in a special construction for your equipment. This construction has the exactly right combination of strength, bending life, and resistance to wear and crushing that you need.

The one best wire rope . . . TRU-LAY Preformed . . . will last you longer and cost less to use. Specify and get TRU-LAY Preformed improved plow steel—the rope identified by the Green Strand.



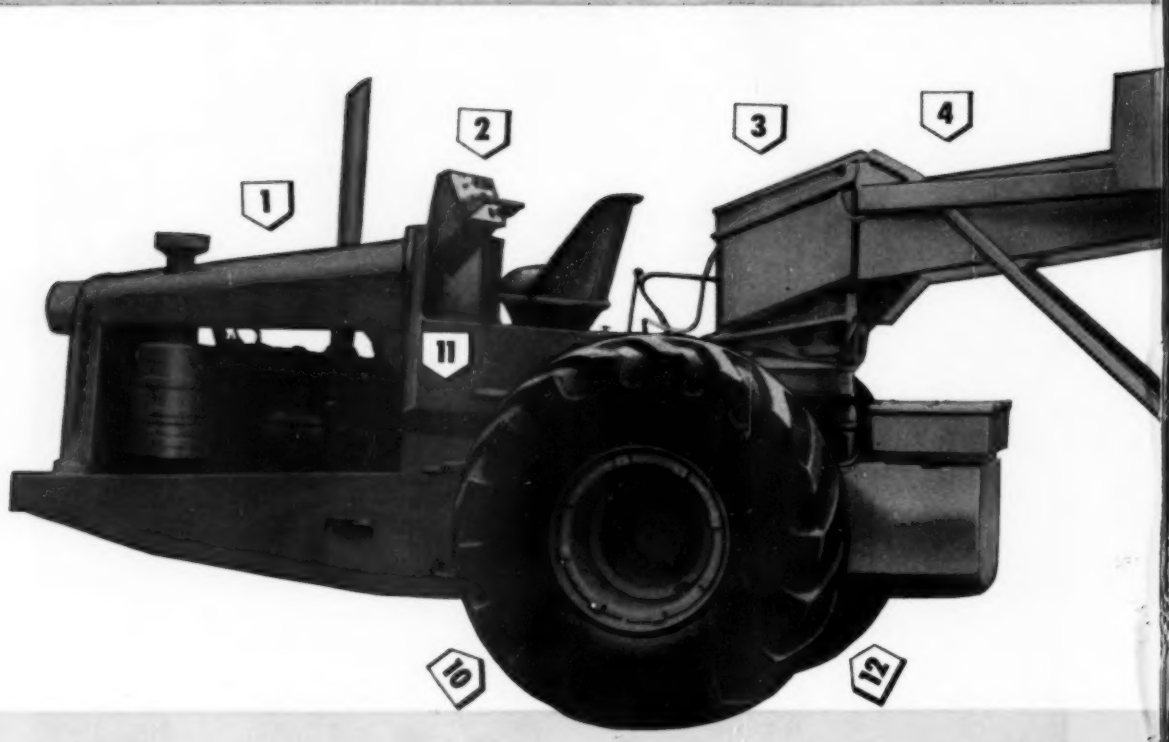
ACCO

TRADE MARK

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

Here's the BOTTOM



Le Tourneau 18-yd. TOURNAHOPPER

1 **Over 5 h.p. per ton of gross weight** ... works with job-proved 186 h.p. C Tournapull prime mover ... has plenty of power to haul full 18-ton loads up steep grades.

2 **Fingertip electric switches,** control dump and steer ... respond instantly ... increase safety margin ... reduce operator fatigue ... eliminate "end-of-shift" letdown. No troublesome hydraulic system.

3 **Positive electric power steer** swings prime mover without use of final drive ... "walks" rig out of mud-holes to firmer footing ... permits safe, accurate working and turning on steep slopes.

4 **90° turns within 15'8" radius** give 34'-long Tournahopper exceptional maneuverability for fast turns off fill, away from loader, and while hauling along narrow levee roads.

5 **Big, steel-reinforced bowl** carries up to 18 tons ... has 18 cubic yard capacity. Bowl withstands shock loads of rock and other heavy materials ... reduces body maintenance costs.

6 **9' x 11' top opening,** low 8'9" loading height, provide big target ... speed shovel, dragline swings, reduce spillage. Rig "tops out" loads with minimum movement under belt loader.

7 **Dump doors lift high,** leave bottom opening approximately same as top. Rocks, sticky material, dirt dump fast without damaging gates. Everything that goes in the top easily comes out the bottom.

8 **Power-controlled "clamshell" doors** wipe clean as they lift to swing up and out ... open full width or partially for controlled dump. No dangling gates.

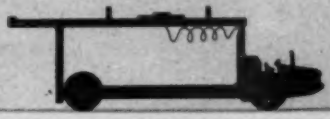
C Tournahopper prime mover is readily interchangeable with these 4 other hauled units to fit future job requirements.

* Trademark Reg. U. S. Pat. Off.
** Trademark

18-ton rear-dump TOURNAROCKER**

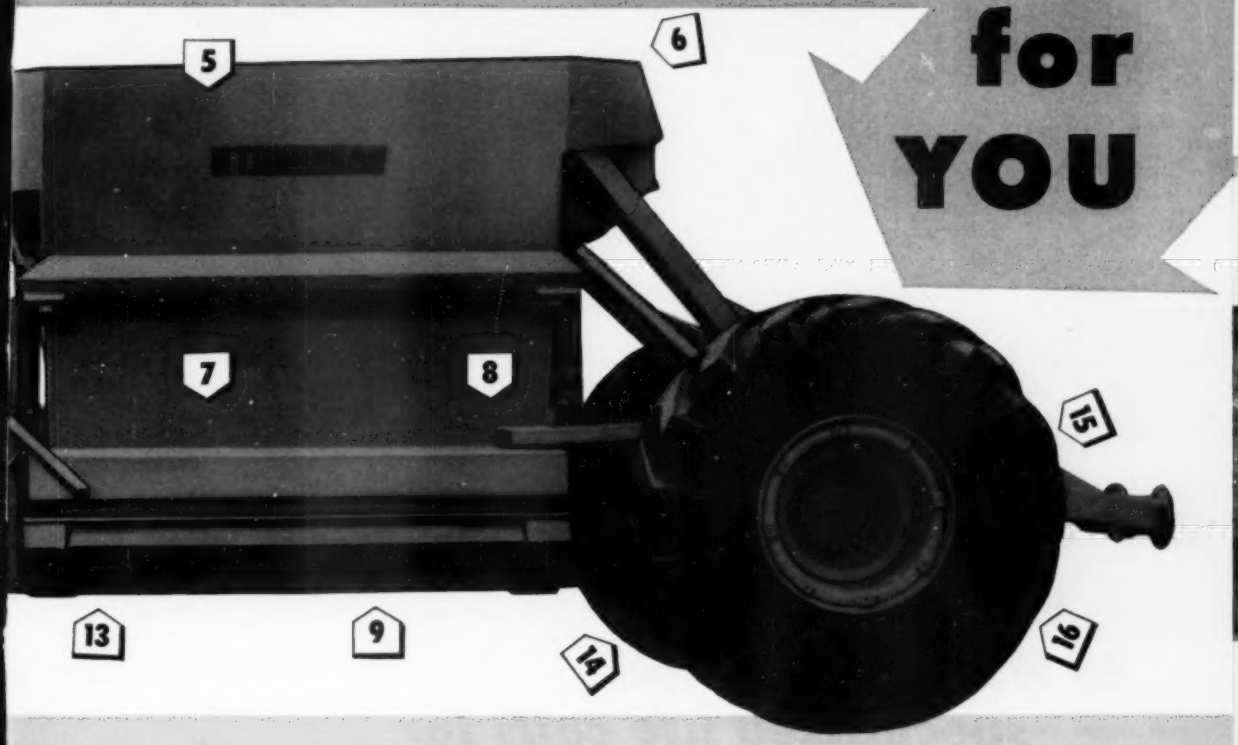
14-yd. (18-ton) TOURNAPULL*

15-ton TOURNACRANE*



20-ton flatbed TOURNAHAULER**

-DUMP dirtmover for YOU



gives you all THESE FEATURES:

9 **25" ground clearance under hopper** permits fast dump and turn over deep windrows. Open doors clear 42" and with prime mover in 90° turn position, you can swing to clear 42" boulders.

10 **51% of loaded weight on drive tires** gives plenty of traction in spongy, wet going. No "extra" small steering wheels to rob power as they break trail and bog down in soft going.

11 **Constant-mesh transmission** (with torque converter) available for instant gear changes. Torque converter automatically selects proper gear ratio, provides maximum power at all speeds, 0 to 33 m.p.h., removes shock loads in power train.

12 **Torque-proportioning differential** automatically delivers up to 4 times the tractive power of slipping drive wheel to wheel on firmest footing.

13 **Optional "Electrotarder" warms body** electrically, keeps loads from freezing.

14 **4-wheel, multiple-disc air brakes,** 3,763 sq. in. braking surface (more per ton than any other hauler) give operator confidence to use high speeds.

15 **Big 21.00 x 25 low-pressure tires,** all around, operate at pressures as low as 30 lbs., give extra flotation, minimize rutting in soft ground. They have less rolling resistance than duals . . . are bigger, stronger, heavier than duals . . . better adapted to withstand load and haul shocks. There's no divided face for rock fragments to wedge in and tear.

16 **Trouble spots eliminated** — no frame, sub-frame, springs, spring hangers, drive shaft, front-end steering wheels, or hydraulic system . . . less time out for maintenance . . . lower maintenance costs . . . smaller spare parts stock required.

Let us show you how Tournahoppers can lower your bottom-dump hauling costs.

Tournahopper—Trademark Tournapull—Trademark Reg. U. S. Pat. Off. 2225

R. G. LeTOURNEAU, INC., Peoria, Illinois

HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

LETOURNEAU LET EQUIPMENT

in WIRE ROPE, too specialized use calls for the RIGHT KIND of muscle

Tough, wiry muscles stand the Rocky Mountain Bighorn in good stead; give him the sure-footed agility he must have to survive on almost impassable heights.

In wire rope, too, the right kind of muscle is mighty important... because different uses present different problems of wear and tear. Bending fatigue. Abrasion. Shock stress. Load strain. Each requires wire rope with the right construction and lay; the right grade of steel and size of wire to best withstand the destructive forces encountered.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the proper combination of physical properties for long-lasting, reliable service on your particular job.

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

THE COLORADO FUEL & IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

WICKWIRE ROPE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

"EUC" SCRAPERS

Haul More Yardage At Less Cost

The "Euc" Scraper has a struck capacity of 15.5 cu. yds., 21 yds. heaped . . . 10 speed transmission . . . 275 h.p. engine . . . top speed, loaded, 28.2 m.p.h.

Four wheel Euclid tractor provides easy, positive steering, excellent maneuverability, and has ample power, traction and flotation for fast loading and travel on steep grades and soft fills.

Owners in all parts of the country report that the Euclid Scraper with a heaped capacity of 21 cu. yds., has outperformed other scrapers of comparable size on a wide range of jobs. As one leading contractor puts it, "The 'Euc' outhauled other scrapers, had less down time, and maintenance costs were about 50 per cent less." After completing a rush airport job, one with a wide variety of soils, another contractor stated, "We're glad that our choice was Euclid over all other makes of rubber-tired scrapers."

Because of fast, easy loading, high travel speed, good traction and flotation and excellent maneuverability, Euclid Scrapers move more loads per hour at more profit per load. Have your nearest Euclid Distributor give you complete information and job proved performance data on this Euclid Scraper—get more production at less cost!

ROAD MACHINERY Co., CLEVELAND 17, OHIO

CABLE ADDRESS: YUKLID

"I urge every American employer to promote the Payroll Savings Plan..."

DECHARD A. HULCY, PRESIDENT
Chamber of Commerce of the United States

"I urge every American employer to promote the Payroll Savings Plan among his employees as a means of building a reservoir of savings."

As President of the Chamber of Commerce of the United States . . . with literally thousands of contacts throughout industry and commerce . . . Mr. Hulcy is uniquely qualified to evaluate the Payroll Savings Plan.

As a business man, Mr. Hulcy puts his finger on a most important accomplishment of the Payroll Savings Plan: the enormous reservoir of savings, *future purchasing power*, built up by systematic saving.

Today, millions of Americans hold Series E Defense Bonds totaling $34.7 Billion. It will surprise many to learn that this figure is $4.8 Billion greater than on V.J. Day. And the $34.7 Billion total of outstanding Defense Bonds is mounting as more and more employers recognize the importance of the Payroll Savings Plan. During 1951 there was a sizable increase in the number of men and women saving through Payroll Saving Plans where they work.

During the calendar year 1951, 45,500,000 $25 Series E Bonds were purchased – a gain of 17% over the previous year. 12,000,000 $50 E Bonds were purchased in the same period, 14% over the previous year. $25 and $50 denominations are the bonds bought by Payroll Savers.

Building a reservoir of savings and future purchasing power . . . contributing to America's defense effort . . . helping to maintain America's economic stability by providing a check on inflationary tendencies, the Payroll Savings Plan is doing a three-way job.

If your company hasn't a Payroll Plan, or if your employee participation is less than 60%, the Savings Bond Division, U. S. Treasury Department will be glad to help you take your place among America's Honor Roll of "Companies on Payroll Savings". Phone, wire or write to Suite 700, Washington Building, Washington, D. C.

The U.S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

Excavating Engineer

NEW!
THE TR 200
REAR DUMP
MOTOR WAGON

Here's your *NEW* LaPLANT-CHOATE *ROCK WAGON*

HERE'S a new addition to the well-known LaPlant-Choate line of Motor Wagons and Earthmovers. The 18-ton TR 200 is a hydraulically-controlled rear dump wagon flexibly joined to the same big rubber-tired tractor so successfully used on the LaPlant-Choate TS 200 Motor Scraper. It combines rugged power, big capacity and high speed with a host of other features to make this unit outstanding in its field.

FEATURES YOU'VE BEEN LOOKING FOR IN A REAR DUMP WAGON

- Stable wheel base assures absolute safety when dumping over edge.
- Rock Lug tires.
- Protected cab.
- Your choice of two diesel engines in the T 200 Tractor . . . a 176 HP Buda or a 165 HP Cummins.
- No obstructions in the wagon body.
- Tilts to 70° from horizontal.
- Full hydraulic control.
- Rear dump advantages.
- Available with heated body for use in cold climate to prevent freezing of material in load.

TR 200 MOTOR WAGON SPECIFICATIONS

GENERAL

CAPACITY	
Struck, cu. yds.	11
Heaped, cu. yds.	15
Tons	18
OVERALL DIMENSIONS	
Length	25'9"
Width	10'7"
Height	10'0"
WHEEL BASE	13'7"
WHEEL TREAD	
Tractor	6'8"
Wagon	8'8"
TIRES	4—21.00 x 25—24 ply rock lug
BRAKES	
4-wheel air Timken-Detroit	18" x 7"
TURNING	
Width required 180° turn	31'3"
Degree of turn each way	60°
HYDRAULIC SYSTEM	LPC Fluid Power Unit
Steering—25 GPM	Model HU25
Wagon operation—40 GPM	Model HU40
SHIPPING WEIGHT	
(Approx. in lbs.)	40,000

T 200 TRACTOR

ENGINE	
Buda Diesel Model 6-DA-779	176 HP
or	
Cummins Diesel Model HRB-600	165 HP
ENGINE CLUTCH	17" Lipe Rollway
TRANSMISSION	Fuller 5A1120
SPEEDS	
(at 1800 RPM—MPH)	From 2.46 to 21.63
STARTING METHOD	Electric 24 V
AIR COMPRESSOR	
Bendix-Westinghouse	7¼ cu. ft. capacity
ELECTRIC SYSTEM	12 V
FUEL TANK CAPACITY—U. S. gallons	70

R 200 WAGON

MISCELLANEOUS DIMENSIONS	
Loading height, rear	5'6"
Loading height, side	8'3"
Bowl width	8'0"
Bowl depth, maximum	4'8"
Bowl length	11'3"
OPERATING METHOD	
Type of ejection	Rear dump, hyd. lift
Number of jacks (double acting)	2
Size of jacks	8" x 31"
DUMPING ANGLE	70°

LAPLANT CHOATE
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Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.

Hydraulic and Cable-operated Dozers.

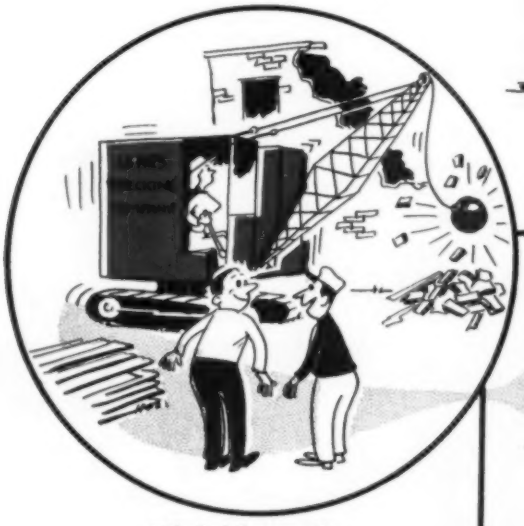
Ex Laffs

By Max Gowin

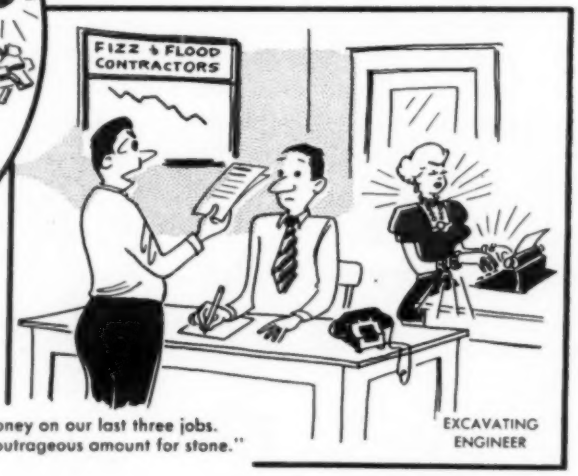
"I have a feeling they're using inferior materials in the construction of this library."

"I want you to meet Jim Thomson, a man who really knows construction."

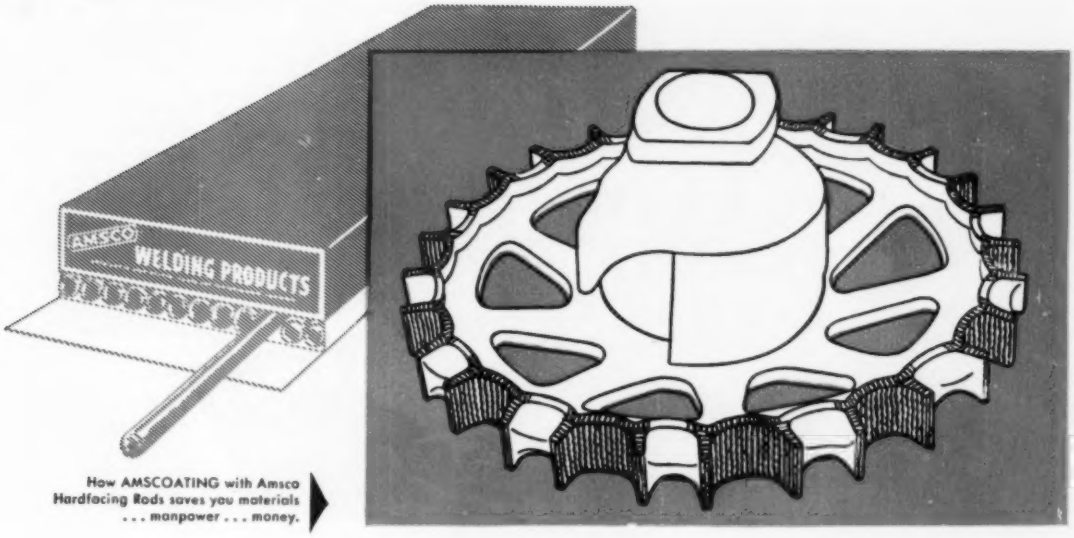
"I was underbid on this job. I'm waiting to see who contracted it for seven cents."



"We find that wrecking goes much faster since we employed women drivers."



"Hodges, we've lost money on our last three jobs. You've been spending an outrageous amount for stone."



How AMSCOATING with Amsco Hardfacing Rods saves you materials . . . manpower . . . money.

These teeth take bites out of repair costs!

AMSCOATING...stands for control of wear by Hardfacing...

Hardfacing rods—and recommendations for their use—are as sound as the manufacturer who makes them. AMSCO has been fighting wear for a half-century—first with Manganese Steel, and later with AMSCO Hardfacing Products.

If you have a problem of wear caused by impact, abrasion, heat or corrosion . . .

Find out how AMSCOATING can save you materials . . . manpower . . . money!

AMSCOATING can make old Tractor Drive Sprockets last 3 times longer than new.

Here's another way to beat the high cost of replacements, down-time and maintenance . . . AMSCOATING the teeth on Tractor Drive Sprockets. Time after time service records have shown that AMSCOATING of sprockets results in these dollar-saving advantages:

1. ***On an average — 3 times the service life of a new, unhardfaced sprocket.***
2. ***2 out of 3 sprocket changes completely eliminated . . . far less down-time, less maintenance . . . more equipment out of the shop and on the job.***

To top it off, sprocket replacements can practically be eliminated. An AMSCOATED sprocket can be reclaimed over and over again . . . *at about half the cost of a new one!*

Get all the facts on how to make these big savings . . . write today for instruction sheet on AMSCOATING sprockets, and the name of your nearest AMSCO Distributor.

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EACH of these three Bucyrus-Erie B-Type Scraper models loads with the same "fountain" action that breaks up chunks and boils material up through to fill the bowl completely.

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WINS ON PERFORMANCE

Time after time the Big Red Team, of TD-24 Tractor and B-250 or B-170A Scraper, comes out on top in field tests — hauling more yards, loading and dumping faster, completing cycles in less time than comparable units.

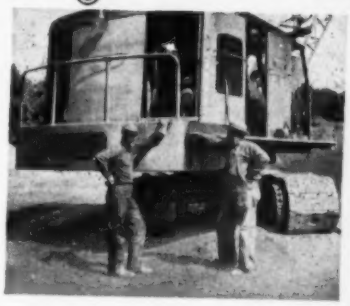
BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

6752

See Your INTERNATIONAL Industrial Tractor Distributor

GM Diesel
Case History No. 728-53
USER: Brown Coal Co.,
Center Point, Indiana
INSTALLATION: 38B Bucyrus-Erie 1½ yd. dragline powered by Model 6-71 GM Diesel.
PERFORMANCE: Owner reports stripping 3500 yards overburden per 10-hour day, using 3 gallons of fuel per hour. Mine produces up to 280 tons of coal per day.



THIS DIESEL

strips 350 yards an hour on 3 gallons of fuel

Co-owner K. W. Brown says, "This rig came with a General Motors Diesel and we're plenty happy that it did. Couldn't ask for better power both on this machine and the HD-10 tractor on which we've put 2000 hours in 6 months." Because of its efficient, gold-saving 2-cycle operation, the GM Diesel engine gets more work done at lower cost in all kinds of mining equipment — draglines, shovels, trucks, tractors, locomotives, compressors and generators. Ask your nearest GM Diesel distributor for the complete story.

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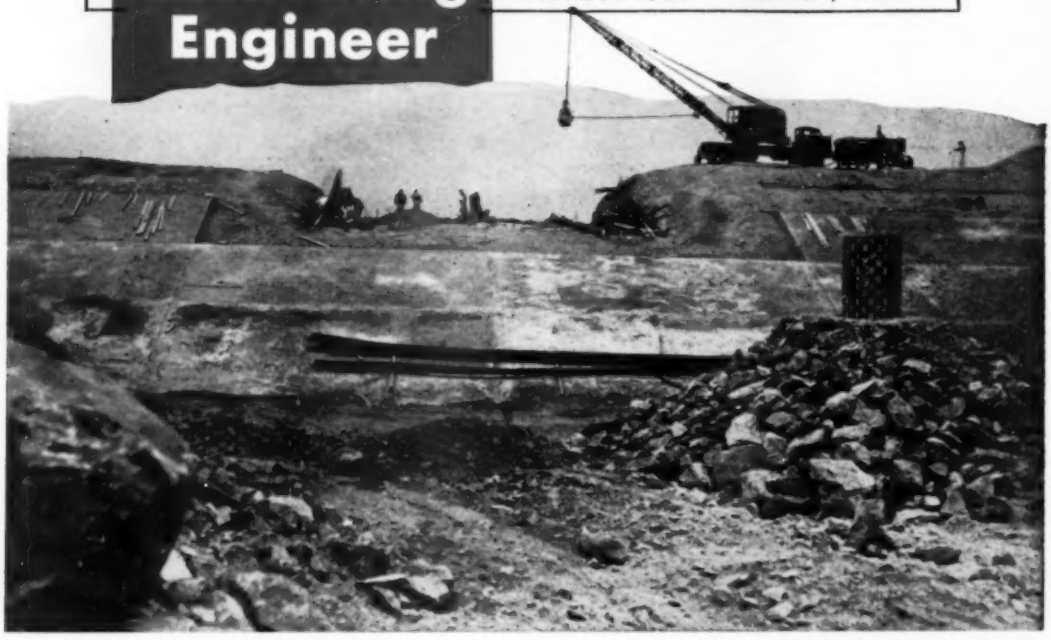


● Looking south, we see Cooks Canyon Debris Basin and Dam. A Lorain truck crane handles trim excavation in spillway section of dam.

Small Dams Can Be Tough

by Robert J. Green

A FEW blocks below Foothill Boulevard, where the Cooks Canyon watershed passes through La Crescenta, Calif., the youthful superintendent of Bent Construction Co., Los Angeles, Calif., stopped his pickup. There was annoyance on his face as he watched his newest dragline pulling against great boulders of granite, some as heavy as 25 tons. They lay in the bottom of the small channel the machine was trying to dig.

Smoke flew from a tooth edge as the bucket ripped into the immovable wall of a boulder. As the machine strained, Superintendent Charles Milburn winced with concern and signalled the operator to move ahead.

"We'll have to drill and shoot it," he yelled, as another pickup drove up and stopped. The driver, assistant superintendent Tom Lambert got out and added, "Yes, and we'll have to pick up the pieces with a spoon! They don't have to be big jobs to be tough, do they, Chuck?"

What Milburn and Lambert were talking about was one of the toughest small jobs of excavation they had ever tackled in southern California. When Bent Construction Co. was awarded the $379,000 contract for a dam and flood control channel by the Los Angeles County Flood Control District, both men knew in a general way that plenty of rocky excavation would be encountered. But they could scarcely visualize how bad it would be, and how many of the big immovable boulders they would find, peculiarly enough, at the important grade line of the channel.

It Had to Be Done

From a Flood Control District point of view, however, the effort being made by men and machines only exemplified all the more the need for the job. La Crescenta, in 1934, was the scene of one of the worst floods on record in California, and a great part of the wall of water and mud of that disaster came out of Cooks Canyon to inundate homes and places of business. Careful engineering studies by the Los Angeles County Flood Control District officials under chief engineer H. E. Hedger showed all too clearly the need for a detention dam and channel at that point.

The job was engineered and designed to intercept water and debris at the foot of the canyon, to drop the debris, and carry the water on down toward Verdugo Wash and the Los Angeles

River. Included in the contract was a 46,000-yd. earthfill dam about 225 feet long at its crest, with a 6-in. reinforced concrete paved face; an outlet transition channel of reinforced concrete about 390 feet long; and approximately 5,500 feet of standard reinforced concrete channel 6 feet wide by 6½ feet high, with 8-in. walls and invert. This channel, on grades of 6, 8, and 10%, passed down through a rocky alluvial fan from the mouth of the canyon.

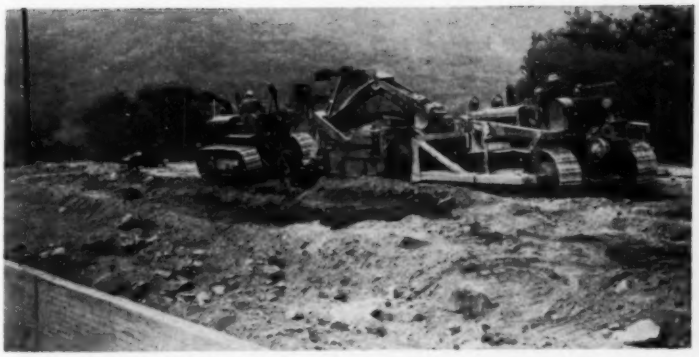
This improvement work, it was estimated, would take care of a rather vital .6-square-mile segment of the Sierra Madre slopes above La Crescenta, and indirectly would give a great deal of protection to residents farther down along the main streams. At capacity, the channel will carry 2,200 cubic feet per second from the overflow spillway in the dam, and there will be approximately 20,600 cubic yards of debris capacity in the reservoir.

Everybody, even Milburn and Lambert of the Bent outfit, knew there was every reason to expect trouble from large boulders. A geological study of the mouth of practically any canyon in the whole Sierra Madre mountain chain shows a natural segregation of overburden from the action of water in bygone ages. The larger boulders are deposited nearest the canyon's mouth, with particles of lesser size farther down. So it was at Cooks Canyon, with the majority of the channel in rocky going.

Channel Excavation

Excavation of a site for the concrete discharge channel below the dam was one of the main items in the project, and by far the most difficult. Realizing how tough it would be, project officials started wrestling with this assignment shortly after the job started in April, 1951.

Some of the worst conditions, so far as boulders and rock were concerned, were in the 2,500-ft. section from the dam downstream. The rocks were bigger and more tightly bedded. For the first portion of this excavation, a Bucyrus-Erie 38-B shovel, equipped with a 1½-yd. Amsco dipper, moved in. Excavation was such that the 38-B could dig and cast the material in one swing, storing the material on a spoil bank until after the concrete channel had been constructed.



• One International TD-18 crawler draws a LeTourneau scraper along the new flood control channel while another pushes. Pusher is equipped with Bucyrus-Erie power control winch and cable bulldozer.

The shovel dug less than 10 feet of ditch before the boulders showed up. As a rule they lay submerged from the surface, in such a position that the equipment could excavate all but the lower portion of the trench at grade line. At this point, the protruding boulders began to catch the dipper. If a boulder was sufficiently small so the 1½-yd. dipper could handle it, the machine dug around and eventually loosened the rock. If not, there was but one solution . . . drilling and shooting. And it was slow business, because the channel passes generally through a populated section, and powder charges had to be extremely light. A Gardner-Denver 365-cfm compressor moved in with 2 Gardner-Denver pneumatic hand-held drills. The boulders were broken, one by one, by drilling them well below grade line and loading them lightly with powder, usually 40% Hercules Gelamite. Even so, it wasn't easy. Because of the danger of flying rock, it was impossible to clean the boulders to grade. They had to be loaded lighter and deeper, split in several pieces, and the pieces removed one by one by the 38-B. Some shifts the machine advanced about 50 feet, while in a few places where the boulders were absent, per-shift footages of 400 to 500 were racked up.

Because of terrain and channel grade, it was impossible for the shovel to cast to the top of the spoil pile after it had opened up the channel to a point slightly below the transition

• Superintendents Charles Milburn (left) and Tom Lambert talk about the tough parts of the flood control job they are now bringing to a finish.

The total value of the contract for a dam and flood control channel in Cooks Canyon, Los Angeles county, was $379,000. Bent Construction Co., holders of the contract, found that hardrock boulders can complicate the building of even a small dam.

section. In the deeper material, a changeover was made and the 38-B picked up its dragline boom and a 1½-yd. bucket. Backing down the line, it dug and cast the material with the same difficulty, encountering boulders, as had the initial attempt. The same methods were used to dispose of the boulders when they lay in the path of the dragline.

Naturally, with great chunks ripped out below design grade line, extensive finegrading became necessary. After the 38-B ripped out the broken boulder fragments, the holes were backfilled by bringing in granular material with the bucket or dipper. An International TD-18 crawler tractor with a Bucyrus-Erie Bullgrader then leveled it off and compacted it to some extent, but in the final analysis it was still not finished grade until a labor gang had put on the final touch ahead of the concrete crew.

The lower section of the channel, near its point of merger with downstream channels, gave a much better digging condition. The ground was sandier and less rocky. Two International TD-18's with Bucyrus-Erie and Buckeye PCU's moved in with LeTourneau LS-type scrapers, and a Caterpillar D7 came in to act as a pusher tractor. These machines handled the lower portion of the 25,000-yd. digging job in the channel, and generally speaking, prepared it so close to grade that the fine grading was minimized to some extent. Excavated dirt from these units was also ramped up and out of the ditch at 500-ft. intervals, and spoiled for use later on as backfill.

As the channel was opened up, concrete crews moved in to stay up with the dirt men. Invert and wall pours were made in 50-ft. sections. Southwest Steel Rolling Mills, Los Angeles reinforcing steel outfit, furnished and installed this material. Standard wooden panels faced with surfaced 1 x 4 tongue and groove flooring served as forms, and the concrete was truck-mixed in from the commercial rock plant of City Rock Co., about 7 miles west of the project. There were only 7 cubic yards in a wall or invert pour, so even that item was slow and costly.

Placing of backfill behind the channel walls presented new problems. The material to be used was that which was surplus from the original excavation, and contained many large boulders and fragments. Compaction was not required, but the restricted area and steep banks alongside the thin wall sections made mass bulldozing impossible if the walls were to be undamaged.

The only solution was "teaspooning" the material into place with a clam bucket, careful bulldozing with small Caterpillar D-6 dozers, and considerable hand work. In spite of precautions there were two instances in the early stages of this work when large buried boulders, unseen by the operators, were rolled down the banks and cracked the wall when they lodged against it. This necessitated costly repairs and resulted in the adoption of a new system.

A backfill "team" was organized which included the 38-B or a Lorain truck crane with clam buckets, two D-6 bulldozers and a hand crew. Working together with one D-6 on each side of the channel, a spotter to watch for hidden boulders, and the clam bucket feeding material from full areas to the low spots on either side in front of the dozers, this combination completed the backfill without further mishap.

In the lower section, backfill was replaced by the same scraper and tractor units which had dug the material. All the excavated material was re-used for backfill, building up the banks above and around the new concrete channel. In time, vegetation will spring up on these fills, and they will harmonize with the man-made structure and withstand erosion better in their own right.

Dam Included, Too

The 225-ft. dam at the head of the channel discharge system was included as part of the construction contract. Rising 43 feet above the bed of Cooks Canyon, the earthfill barrier had 3:1 upstream and 5:1 downstream slopes, and contained about 46,000 yards of material in a single zone.

The area was cleared off to a good foundation, and the reservoir area was stripped of brush by an International TD-18 mounted Bucyrus-Erie dozer blade. Before any earth fill was placed, a large outlet pipe capable of passing 150 cubic feet of water per second was installed. The intake tower, protected at the base by rip rap, was placed in the reservoir upstream of the dam. The outlet pipe passed underneath the dam and discharged through a transition section into the channel downstream from the structure.

The borrow area for earth fill was on an unpaved road approximately one-quarter of a mile from the damsite. It consisted of a hill of earth and disintegrated granite, most of which was exceptionally dry from long years of drought.

Cut stakes were placed at the top of the sidehill cut, far enough back so when the bottom of excavation was

• A Bucyrus-Erie 38-B clams in backfill to the walls of the new flood control channel near La Crescenta. It was impossible to move fill in by dragline because heavy boulders would crack the concrete walls.

reached, enough material would have been produced to build the dam. A Caterpillar D8 with a Le Tourneau K-30 rooter had to be used to loosen the formation and boost shovel output. Working from the top, the tractor and rooter loosened and shoved the material over the edge to a Northwest 25 shovel, which loaded seven 6-yd. International trucks. These trucks hauled and dumped the material on the dam.

Truck In Water

The dry nature of the borrow pit complicated fill operations a great deal, because even when water was applied, it refused to soak in readily. Arrangements for water were made with Highway Highlands Water Co., and 3,000-gallon water trucks shuttled back and forth between the water reservoir and the dam. A scarifier was virtually useless for blending water and earth, however, so a Killefer heavy-duty disc harrow had to be brought in to process the fill. It worked better, and by putting in the moisture in several passes and making many trips with the disk, a good job was obtained. Densities required were 90% of the Modified AASHO method and were obtained consistently. No lifts were made greater than 9 inches thick, uncompacted, and at least 12 passes of a Southwest sheepsfoot roller were made on every lift.

The upstream face of the dam was hand graded and the concrete slab for wave protection and also the spillway were placed by the same truck-mix methods which featured the channel concrete.

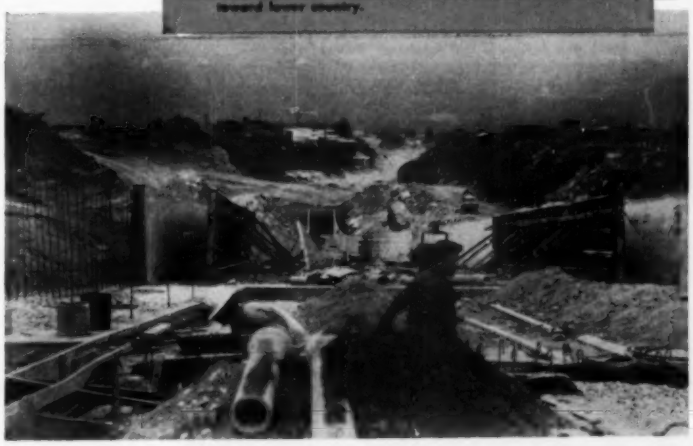
The downstream face was protected by rock placed by a Lorain Motocrane equipped with an Owens clamshell bucket.

In spite of tough excavation and other problems, the steady application of work and know-how to the project had a telling effect, and by the time the winter rainy season was due in December, the job was out of danger. The spillway was largely finished, the dam was in, most of the facing was on, and the channel was finished. Superintendents Milburn and Lambert, after their all-summer battle with rocky formations, were looking eagerly to their next job: a freeway project which would be mostly in dirt.

Truly, Cooks Canyon is a job Bent personnel will remember vividly as winter flood waters roll down the new channel toward the sea.

Above: Workmen set reinforcing steel along the left wall of the spillway. Below: Here is the Cooks Canyon watershed above the debris basin, the clearing in the reservoir area, and the intake tower.

Looking south from the spillway section of Cooks Canyon Dam, the concrete channel transition leads down toward lower country.



• After trimming damaged areas, live rubber is buffed in preparation for first patching step.

• Above: Buffing of interior surfaces is made easier with this hydraulic tire spreader. Below: When interior repairs must be made, preformed patches are used to back up cushion and tread gum.

Hanna's Shop Cuts Tire Replacement

All M. A. Hanna Co. mines on the Mesabi range are now using the facilities of the Cooley District tire shop to help trim the replacement cost of heavy duty truck tires. (Reprinted from *Hanna Miner.*)

SINCE the days when trucks first began handling iron ore on the Minnesota ranges, considerable study has been given to problems of repair and maintenance of tires for the heavy duty trucks. Little wonder, since the cost of a conventional heavy duty truck tire has risen from $180 to $800, and some special purpose tires cost up to $1,600.

To increase the efficiency and usefulness of truck tires, the year 1942 saw the establishment of a tire repair shop at M. A. Hanna Company's Cooley mine. The shop, 36½ x 22 feet, was set up to meet the tire repair problems that came with the use of heavy duty trucks in the open pit mines.

By 1942, ore haulage by trucks was considered an established practice, and the largest truck tires being repaired at the Cooley tire repair shop were 14.00 x 24. Since 1942, however, the tonnage capacity of haulage trucks increased considerably, and new tire designs resulted in sizes ranging up to 18.00 x 24. Tires became larger, tread and carcass designs were created to take greater punishment and give longer service.

Enlarged Quarters

During 1946, the tire shop moved into new and enlarged quarters in the northeast corner of the expanded Cooley shop. Now divided into separate shops by sliding doors, the curing and buffing room measured 25 x 44 feet. Skiving and tire repairing occupied an enlarged area 19 x 42½ feet.

The present shop equipment is basically the same as was installed in the original shop. The exception being advanced machinery modifications and the replacement of smaller equipment with new equipment capable of handling the larger tires.

The Cooley tire shop is believed to be one of the most completely equipped tire repair shops operated by a mining company; it is also one of the few equipped to cure tires in addition to the patching and repairing services offered.

Since 1948, all M. A. Hanna Co. operated mines on the Mesabi Iron Range have utilized the services of the Cooley tire repair shop. Stacked in the receiving room are the rock-torn, road-beaten carcasses of truck tires. The damaged areas, marked by the tire inspector during his field inspection, are indicated with arrows marked in yellow chalk. The name of the mine shipping the tire is also written in yellow.

Following the tire repair procedure step-by-step, the tires stacked in the receiving room are probed and inspected for cuts, bruises, separations and tears. Inspec-

tion completed, each damaged area is neatly and symmetrically cut, working through the bruised rubber down to live, fresh rubber. The exposed live rubber is buffed with an electrically operated buffing machine to prepare the area for the initial step of patching.

The patching room, separated from the buffing room, is entered through sliding doors which prevent dust, dirt and oil particles from entering and contaminating the cemented surfaces as the tire repairs progress from one stage to another.

The materials used in tire repairing are determined by the position and extent of damage. Surface repairs call for the use of cushion gum, which comes in sheets and rolls; this material is used to restore the damaged area to the original thickness of the destroyed ply. Applied in strips, cut from rolls or sheets, the cavity is carefully built up until the proper thickness is attained. Tread gum is also applied in strips cut from rolls or sheets and the built-up method of application is used. This material is used to restore the tread surface to the original height and thickness.

When inside repairs are to be made, preformed patches are used. These come in kits which contain two patches. Both patches are used, laying one over the other. Each patch contained in the kit is constructed with the ply cords running in opposite direction to the ply contained in its mate. This method of patch construction imparts greater strength to the repaired area and assures longer wear.

Patching and repairing completed, the tires are carried on an endless mono-rail by an electric hoist to the "cooker." Placed inside the "cooker," the tires are sealed in and allowed to cure for a period of six hours under 85 lbs. pressure of live steam at the temperature of 270° F. When cured, the tire is removed and allowed to cool. Properly cooled, the tire is placed in the shipping room for delivery to the mines.

From Jan. 1, 1943 until Dec. 1, 1951 the Cooley tire repair shop has returned to service 16,558 tubes of all types and about 7,000 tires.

• To check for leaks, a hydraulic four-pronged hanger forces inflated inner tube into water tank before and after patching. Escaping air bubbles indicate presence of leak.

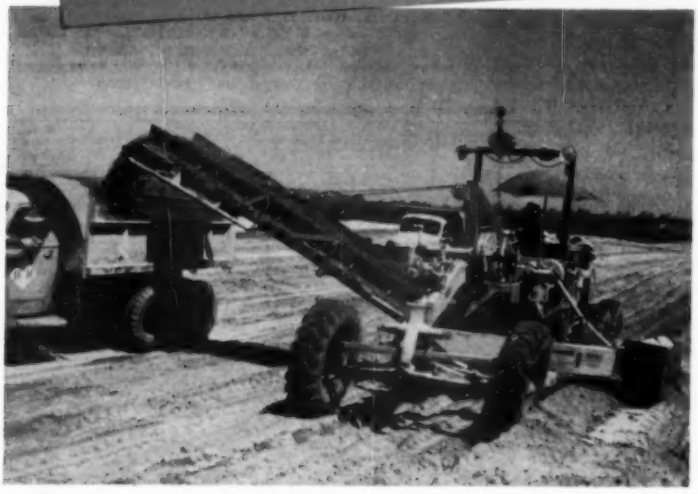
• Above: Below laying cushion and tread gum, cavities must be cemented. To provide proper adhesion, cement is allowed to dry 4 hours. Below: When laying tread gum, stitching tool is used to insure maximum adhesion. Rapid movement of tool eliminates air bubbles, an important cause of patch failures.

• The big "doughnuts" are cooked in a pressure cooker under live steam at 85 lbs. psi. Curing process requires 4 hours.

Five Firms Fill Four Folsom Dam Contracts

by Robert Lee Behme

Work is under way at Folsom, Calif., on these early stage Folsom Dam jobs: an auxiliary dam, tailrace channel and powerhouse site, diversion tunnel, and abutment excavation. Five home-state firms were low bidders for the work which is under joint supervision of Corps of Engineers and Bureau of Reclamation.



• A Do-More loader, averaging 250 yards an hour, loads International KB-8 with decomposed granite for zone 3 fill. Below: General view of the mile-long auxiliary earth fill dam which forms one side of the proposed 12 mile long reservoir.

UNDER four separate contracts, five California firms are excavating, filling, blasting and drilling on Folsom Dam Projects on the American river, just outside the small prison town of Folsom, Calif. The project is under the joint supervision of the Bureau of Reclamation and the U. S. Army Engineers. Completed, the dam will cost over $60 million and will serve as a flood control and irrigation dam, and a power station for the Sacramento valley.

D & H Construction Co. with M. H. Hasler Co. both of Santa Ana, Calif., under a contract with the Corps of Engineers, are constructing a mile-long auxiliary earth fill dam between two hills which form one side of the proposed 12 mile long reservoir. This auxiliary barrier fills a low saddle on the reservoir rim. Guy F. Atkinson Co. of San Francisco, under a contract with the Bureau of Reclamation, is blasting and clearing the river bed for the construction of the tailrace channel and powerhouse site. T. E. Connolly, Inc., also of San Francisco, under a contract with the Corps of Engineers, is constructing a diversion tunnel; and H. Earl Parker Co. of Marysville, under a contract with the Corps of Engineers, is working on right and left abutment excavations.

The Morrison-Knudsen Co. of Idaho has recently completed several earth fill dikes between other hills which rim the proposed reservoir. A contract with the Corps of Engineers for the main section of the dam was let Sept. 13, 1951 to joint venturers, Savin Construction Corp., Conn., and Merritt, Chapman & Scott, New York City, for a low bid of $29,440,000.

Build Auxiliary Dam

Across the valley from the abutment, tailrace and tunnel construction sites, the D & H Construction Co. with the M. H. Hasler crews are working two 10-hour shifts on the 120-ft. (average height) high earth fill dam being constructed between a hilly ridge and a camel-like hump called Mormon Island in honor of a Mormon settlement long vanished.

The D & H crews are constructing the earth fill dam over an area which, in the early 1860's, was famous for its gold production. Following the initial gold strike, three large scale gold dredging operations were carried on in the area where the dam is being erected —one as recent as two years ago. As a

consequence, the area was a mass of tailings when W. J. Darkenwald, general manager, and Arthur Gray, chief engineer, began initial construction.

The dam, called the Mormon Island Auxiliary Dam, after the Mormon Island hill, is constructed of four different materials. The center core, extending from top to bottom, is to be constructed of tough local clay. The specs called for this core to be well grounded on bed rock. Core drillings made in the area showed that bed rock lay about 40 feet under the tailings.

Crews using Caterpillar D8's with Caterpillar scrapers and two Northwest 80D's with 2-yd. dippers began the initial excavation. On the ends and in the center of the area, bed rock was reached at 30 to 40 feet without difficulty, but at one spot just east of the center point, the D & H crews hit a water table. Dewatering became a difficult problem. It defied the well-point system which D & H installed.

D & H crews moved in with one Northwest 80D. The soupy clay and water combination was scooped up in the shovel dipper and sloshed into waiting International KB-8's and Euclids and hauled to a dry dump area. Once D & H had the water under control, it was discovered that bed rock at that point would not provide the seal for the clay as required in the specs. It was decided to put down a concrete curtain by grouting to depths of about 60 feet. Grout was shot into the bed rock at 10-ft. intervals under pressure.

The crews were able to solve the dewatering problem. On each side of the bed rock footing, on which the core will finally rest, D & H crews dug a narrow 10-ft. deep channel. The water from the pockets oozed from the sides of the cut down into the channel. The channel water slanted into sumps at either end. On the east side of the bed rock the water was sucked into 3-in. hose and pumped across the top of the cut and directed into the pool on the other side.

Here a pump runs water from the west pool up the side of the cut and out to drain.

Grout for Clay Core

When D & H crews reached the required depth along this section, the bed rock was grouted for the clay core. As this section of the dam was under construction, seepage was intercepted by a drain paralleling the core.

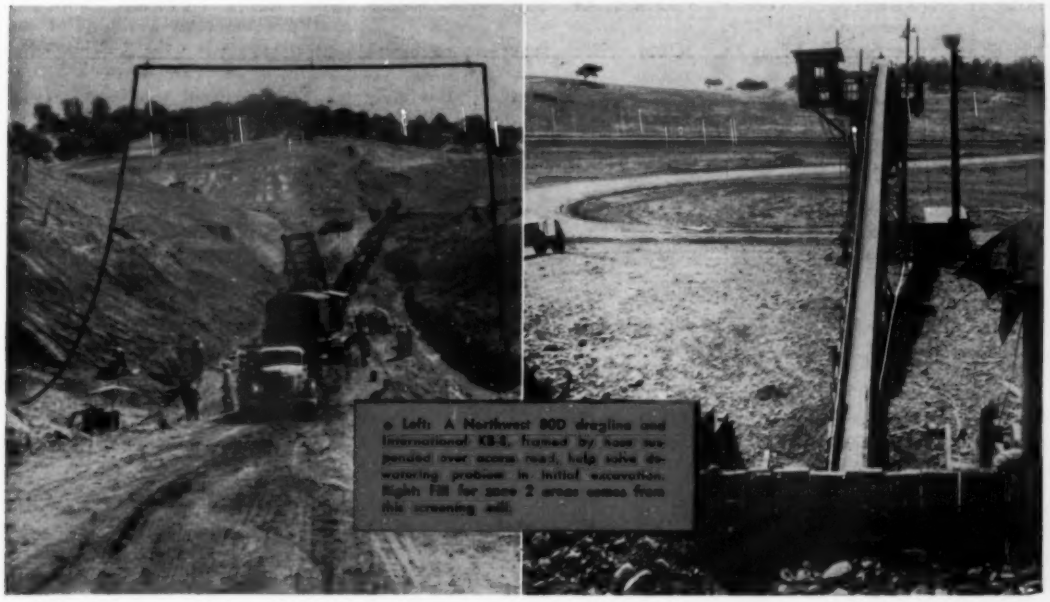
On the other sections of the dam, fill progressed rapidly. While the fill consisted of four classes of material, the four sections were built up simultaneously so that no material was ever more than one truck load ahead in height.

The center core, zone 4 fill is clay. On either side of the core is the zone 3 fill of decomposed granite. Again, on either side of the zone 3 fill is a section of screened (2"-D) dredger tailings. The tailings were run through a mill and all oversize over two inches removed. This screened material comprises the zone 2 fill. Zone 1 fill, the outside material on both sides of the dam is composed of dredger tailings as they are hauled from the borrow pits.

Place Rip Rap

When the dam is completed, the upstream side will be covered with 160,000 tons of rip rap which is scheduled to come from a section of the tailrace excavation. The rip rap and the heavy dredger tailings will prevent damage by wave action when the reservoir is full.

All fill hauls were relatively short, none being over ½ mile from the dam. Dredger tailings were hauled from a borrow pit staked out by the Army Engineers. An extremely rocky "U" shaped road led into the zone 1 borrow pit, bringing the seven KB-8's directly under the 1½-yd. dipper of the Northwest 80D. There are no spotters at this point, and it is up to the driver and the shovel operator to get together. Fill for zone 2 areas came from a screening mill not far from the zone 1 dredger pits. The mill was constructed at the foot of a huge mound of dredger tailings so that a Caterpillar D8 with a dozer blade could push the rock to



● Left: A Northwest 80D dragline and International KB-8, framed by hose suspended over access road, help solve dewatering problem in initial excavation. Right: Fill for zone 2 areas comes from this screening mill.

• Right: Here are of three mobile grease units in servicing Caterpillar crawler in borrow pit during lunch break. This one is Ford-mounted. Below: Cable rigged between tandem axles kept rocks from slashing tires.

the loading belt where it moved to the mill for processing.

Loader Handles Zone 3 Fill

On the opposite side of the dam, away from the dredger tailings, a Do-More loader excavated decomposed granite for zone 3 fill. The decomposed granite lay close to the surface and the loader averaged 250 yards an hour. The loader kept a fleet of eight to ten KB-8's on the move. It took these trucks about 30 minutes for a round trip. They averaged about 12 to 15 trips a day.

All double-lane dirt roads leading to the many borrow pits were graded every two hours with a Caterpillar motor grader. The grader leveled one side of the road every hour, returning on the opposite side an hour later to equalize the cut.

Three Super C Tournapulls and two DW10's handled the fill in the clay pit. These machines made about 20 trips a shift. The borrow was gummy clay and the rubber-mounted scraper teams were push-loaded by a Caterpillar D8.

Once a layer of fill was placed on the dam, the area was then tamped with a sheepsfoot tamper loaded to 42,000 lbs.

The D & H repair shop was built inside the proposed reservoir area, at the base of the dam. It was constructed at this spot because the engineers felt this was the center of all construction activity: a spot easily reached by all equipment and repair crews.

D & H established three distinctive systems of preventive maintenance and repair. The 23 KB-8's on the job were fueled from a double unit gasoline pump placed about 50 yards from the repair shops. The trucks lined up for gas during lunch hours and at the end of each shift.

At the end of the night shift, around 2:30 a.m., the trucks were brought into the repair yard where they were parked. Night repair crews fueled, greased, serviced and checked over the trucks. Each truck was greased every night. Once a week, the oil filter and oil was changed as well as the differential and transmission.

Three mobile grease units handled the Euclids, Tournapulls and Cats in the borrow pits during down time at lunch. These units carried a two man crew and each truck serviced four to six machines during the period. D & H serviced all trucks, Euclids, Tournapulls and Cats with Shell oils and greases.

The original bid on the D & H spread called for 660,000 yards of unclassified excavation and 3.5 million yards of earth fill, but with the added excavation due to the water table, the fill and excavation may easily top five million yards. Basic bids for the projects were $2,194,484.

Personnel heading D & H Co. and M. H. Hasler Co. includes W. J. Darkenwald, vice president and general manager; S. G. Laughlin, secretary-treasurer; Arthur Gray, chief engineer; George Renauld, general superintendent; Walter Haigh, office manager; Gornard Keller and Bud Kelley, general foremen and Jack Alexander, master mechanic. Total output on the project is close to 20,000 yards a day.

Construct Diversion Tunnel

Under the right abutment of the main concrete dam, the T. E. Connolly, Inc. crews under the direction of Earl T. Walsh, general superintendent, are driving a diversion tunnel. The tunnel has been designed by Army engineers to divert the American river during construction of the main dam.

The American river has an unusual flow range. During the dry season from May to December, the river carries an average flow of from 200 cfs to 600 cfs but it has flashed during peak seasons to more than 200,000 cfs. Because of this wide range of flow, the diversion tunnel was designed to carry over 12,000 cfs to provide a margin of safety during construction.

Before Connolly's crews started the construction on the diversion tunnel, they had to excavate an entrance channel approximately 300 feet long. The tunnel itself will bore some 60 feet below the foundation of the right abutment. Cofferdam plugs will be con-

structed across the upper end of the entrance channel and across the lower end of the exit channel. These plugs will be cut away after the tunnel is lined.

Once the tunnel is completed, it will be used by the contractors on the main dam, Savin Construction Corp. and Merritt, Chapman & Scott. The plugs will be draglined out and the river will be directed through the tunnel while the river bed is dammed with two cofferdams, one near each end of the tunnel. After the main contractor has completed construction of the dam, the diversion tunnel will be plugged with concrete.

The material found at the portal site is faulted and cross faulted granite with an overlay of disintegrated granite. This is the structure of the area of the portal cut on which Connolly's crews are now working. When completed, the portal cut will be 110 feet in depth and over 350 feet long. It is being carried on a 1:1 slope to width of 21 feet at the invert grade.

Blasters are shooting 12 foot lifts on approximately half of the area then moving drilling equipment and shooting the other half so that the area goes down pretty much as a unit. The area last blasted is excavated while the area previously excavated is being drilled for more blasting.

During drilling operations crews use two Ingersoll-Rand DA 30's mounted on FM2 wagon drill frames. They also use eight Gardner-Denver jackhammers and a Caterpillar-mounted jumbo with a bar mounted on the back which holds four DA 30 Ingersoll-Rand drifters. It drills 1,500 to 2,000 feet of down hole every seven hours.

They are using a Bucyrus-Erie 44-B shovel with a 2-yd. dipper at the entrance channel. A spotter directs the three end dump Euclids which belong to Connolly. The trucks haul the spoil material about a quarter of a mile to the stock pile area near the Hinkle reservoir.

The road to the waste dump, which skirts the river bottom, is slightly upgrade. Connolly has one Caterpillar D8 dozer grading the road every day.

The Euclids haul 5,500 yards of spoil every 42 hours. For two 7-hour shifts, this averages over 11,000 yards a week.

The other Connolly work on the Folsom project is a permanent access road to the powerhouse site. The road will be used during construction and once the dam is completed, the road will be black topped and it will be used as the main road from Army Engineer headquarters to the powerhouse. An 80D Northwest shovel and Koehring Dumptors are making the excavation.

The basic bid on Connolly's work called for 102,000 yards of unclassified excavation, 5,000 yards of concrete tunnel lining and 48,000 yards of fill on the access road. Connolly's bid was $642,900. Key men on the T. E. Connolly contract are: Earl T. Walsh, general superintendent; Joe Barnett, engineer; and W. Puccetti, master mechanic.

Dig Tailrace Channel

Directly below Connolly's crews, the Guy F. Atkinson Co. crews are excavating for the powerhouse site. About one mile downstream from the powerhouse site, Atkinson crews are clearing the river bed for the tailrace channel. This work is under supervision of the U. S. Bureau of Reclamation who, under the authorizing legislation, will build the power plant.

Excavating operations on the river

• Above: Looking towards Mormon Island four zones of fill area are shown. To right of Caterpillar grader International trucks head back after spreading fill. Upper right: Blasters shoot 12 foot lifts on half of parcel site and then shoot remainder bringing down area as a unit. Right: Northwest shovel loads blasted rock as crews prepare previously excavated area for further blasting.

bed are being carried out while the river is at its driest stage. A. H. Steiner, project manager, found that there was little water to divert. During the dry season, most water can be handled by a diversion dam a short distance below the main dam axis. Pacific Gas & Electric Co. owns the diversion dam. The small amount of water in the river at the tailrace point is either handled by sump pump or pumped up to a channel which existed in the hillside above the shovel in the river bottom. The channel was sloped so that the water ran into a galvanized culvert which re-directed the water back to the river bed beyond the shovel crews.

Two Bucyrus-Erie shovels are in operation here. A 5-yd. 120-B is working at the east end of the channel, while a 4-yd. 88-B is excavating farther up the river, almost in the shadow of Folsom State Prison, to clear the way for the tailrace section.

The 120-B operates in the mucky water that seeps up from the clay bottom river bed. A spotter directs trucks to either right or left of the shovel to minimize the turn on the shovel. At most spots on the river bed excavation, Atkinson crews had to blast boulders for shovel loading. Power is supplied to the 120-B from lines on the river bank.

Four Atkinson-Western 22-yd. rock bodied trucks, specially built for Atkinson in 1941, haul from the shovel. The first 50 yards of haul from the shovel are through the soupy clay of the river bed.

Once the trucks leave the river bed, they drive up a steep, straight, well-graded road to a level cross road where they turn right for the 200-ft. haul to the dump area. The round trip takes about 10 minutes and the trucks complete five to eight trips an hour.

The dump area at this point will become an access road for main dam contractors to haul aggregate from a borrow area down river. All spoil material not used on the access road is being dumped in stock piles. These will be used for rip rap on dams and dikes near the main dam.

Up river about ½ mile, on the tailrace section, the 88-B is receiving its tryout. It is operating in the river bed like the 120-B, but the conditions here are not so muddy.

As with the 120-B, a spotter directs the trucks to the right and left of the 88-B. The shovel loads to three Euclids and three 22-yd. rock bodied Atkinson-Westerns. They are loaded in three to five minutes and are dumping their spoil material on rip rap stock piles.

These trucks, like those serving the 120-B, complete a round trip in about 10 minutes.

On the hillside above the 88-B, a 54-B with 2½-yd. dipper excavates rock and dirt for the powerhouse site. Six 20-yd. Atkinson-Western trucks and twelve 15-yd. Euclids are being loaded from this area. They have about a 500-ft. haul from the area. Blasting is necessary on this section, and Atkinson crews shoot at the end of shifts.

Changes Up Yardage

Atkinson specs called for 243,000 yards of excavation at the tailrace and channel section. The bid was $1,500,000. Some alterations in the elevation of the powerhouse site will increase the yardage figures before the job is completed. Atkinson also has some grading near the Army Engineers' offices where the contract calls for penstock fabrication area and warehouse site.

East of the powerhouse site, the H. Earl Parker Co. is drilling and blasting the hillside of the right abutment. At the moment, the Parker crews under the direction of Ed Bell, general superintendent, are working solely on the right abutment. Once that is completed, they will shift across river to the left abutment.

Primary excavation on the right and left abutments had been prepared by Hawley, Ramlose and Hawley before Parker's crews started their abutment excavation early in February. The Hawley, Ramlose and Hawley crews had gone down about 20-25 feet under their contract with the Corps of Engineers.

The Parker crews started by removing soil overburden. Fifteen feet down the overburden ended and from that point on, it has been solid rock. The material on the Parker job is like that found by Connolly at the portal. The huge granite boulders are packed solid around fissures of decomposed granite running down to the solid bed rock base on which the dam will rest.

Abutments Taper

A depth of 115 feet at the far end of the right abutment will taper to a depth of about 75 feet near the river. The left abutment will be excavated to a depth starting at 96 feet near the end, tapering to 75-ft. depth at the river. The average width on both abutments is about 145 feet and both are 450 feet long. Slopes on both abutments are 1:1. Penstocks will be in-

• Working at east end of channel in mucky water seeping up from clay bottom river bed is this Bucyrus-Erie 120-B shovel.

• Further up the river from the 120-ft. the Bucyrus-Erie 88-B clears the very flat railroad section overlooked by Folsom State Prison.

stalled in the right abutment only.

Because of the complicated structure of the material, blasting has become a tough problem for Parker's crews. Specs call for final excavation to come within barring and wedging distance of final dam limits. Bed rock at the proposed depth must be solid and capable of providing the seat which the base of the dam demands. To keep the bed rock from shattering, Parker's crews are shooting in controlled 10 and 12-ft. lifts.

On the controlled lifts, blasters are using Hercomite 1 and 2 exclusively. The powder is tamped in the holes under the direction of Powder Foreman Al Wear. To drill the rock for blasting, Bell is using four Sullivan wagon drills, two 573 Gardner-Denver drills and two Chicago pneumatic drills and 6 Gardner-Denver jackhammers. The power is supplied by one 500 Gardner-Denver compressor, and two 365 Gardner-Denver compressors and one 600 Ingersoll-Rand compressor.

A Northwest 80D with a 2½-yd. dipper handles the loading from the pit area. Three 16-yd. Tournawagons and two 22-yd. rock bodied trucks, rented from Camillo Construction Co., are loaded from the shovel. Spotters are used for loading direction.

The trucks have a level haul of about 500 feet. Spoil material forms rip rap for one side of the river and will become an access road for Connolly when completed.

Permanent Dam Headquarters

Army Engineer and Bureau of Reclamation offices are spotted in an almost central location on the highway between the Atkinson and Parker camps on the north side of the American river. The well-designed, stained plywood offices of the Army Engineers will serve as permanent headquarters for dam personnel when Folsom Dam is completed.

All roads around the Army Engineer and Bureau of Reclamation offices are permanent black top roads. On the perimeter of permanent headquarters, dirt roads fan out in all directions to the working areas of the contractors.

Under the direction of Corps of Engineers District Officer Col. Clarence C. Haug, C. E., the Folsom project is supervised by Fred Geiss, project engineer. On the project, W. G. Clark is earth fill dam engineer; I. E. Burks is engineer in charge of the main concrete dam; and R. H. Shaw is office engineer.

H. E. McInnis, field engineer at the Folsom District Office of the Bureau of Reclamation, is working with the Army Engineers and his staff is coordinating closely with the private contractors. When the project is completed, expected 1958, it will stand as a working monument to the skills of the two construction services of the United States, and the labor and ingenuity of the California contractors.

What's New in Explosives Safety

by F. D. Bickel*

Blasting safety and efficiency are closely linked with the profit sheet in open-cut excavation. In this speech delivered before the Cement and Quarry Section at the National Safety Council meeting in Chicago, Mr. Bickel points out measures that may help reduce explosives accidents.

TREMENDOUS strides have been made during recent years in making dynamite safer to handle on the job. Most of this accomplishment concerns the formulation or make-up of the explosive itself, and many of you are familiar with these developments. Also, we have learned more about safe methods of loading in the bore holes—what can be done with safety and what practices are dangerous. The fact remains, however, that even the quarry grades of dynamite with which you are familiar are made to explode. As such, they are relatively dangerous. I refer now to the ammonia and ammonia gelatin types that are most widely used in quarry work and in general are safer than the old type dynamite that contained high percentages of nitroglycerin. However, they are far from fool-proof and for safe and successful use require strict adherence to certain fundamental practices based on the characteristics of the explosives.

For example, you all know they will burn and later explode, so we keep fire away. They may go off from too much friction, so when we tamp them in a bore hole, we do it carefully and without too much force. Also, they can be fired by a rifle bullet as small as a .22.

The explosion of a half-pound 1¼ x 8 inch cartridge will set off other dynamite as far as 1 to 3 feet away in open air. Fifty pounds will do the same thing 10 feet away. This sensitivity trait of high explosives has been the cause of a great many fatal accidents over the years. Several of major proportion occurred during the past year.

As most of you know, a very common practice in loading churn drill blasts in quarries is to pile the individual loads at each hole. The distances between holes may be said to range from 10 to 35 feet. The dynamite charges per hole vary according to spacing and height of face but may be considered as ranging from 50 pounds to 5,000 pounds. With explosives distributed over the top of a shot area in this manner, it can be readily seen that if a premature occurs in any portion of the area, the entire amount lying on the surface is bound to detonate, taking everything with it, both men and equipment. And this is just what happened in a number of cases, including one several years ago that amounted literally to a catastrophe. The most recent instance, which, incidentally, involved three killed and four injured, occurred less than a year ago.

In my opinion, every operator is vulnerable unless he has done one of two things: First, unless he has seen the light and is handling his explosives on the top in accordance with the best available advice and in such a manner that the detonation will be very unlikely to propagate from pile to pile; or second, unless he is using a cap-insensitive blasting agent such as "Nitramon," with which such propagation is practically impossible even though the charges are placed at the holes in the usual manner.

Develop Chart

Undoubtedly, everybody in the industry has recognized the hazards of propagation on the surface for many years, but the du Pont Company decided to do something about it. The

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problem was first submitted to our explosives chemists, who told us that it was possible to calculate the distances at which various quantities of dynamite would propagate or jump. This was done. Then, in order to corroborate their findings, actual tests were made in a remote section of Canada in which amounts ranging up to several hundred pounds were exploded on the ground. All of the standard quarry grades were used, and these were placed on both solid rock surfaces and on soft ground in order to fully evaluate all conceivable factors. As a result, we were able to determine the maximum distance at which a given amount of explosives would fire another pile by influence or propagation.

From this information, a tabulation was made up showing two classes of data: first, these maximum distances at which different quantities will cause a detonation every time; and second, the distances at which the same quantities would fail every time to detonate another pile.

Each quarry operation presents a different problem in safe distribution, but we believe all of these problems can be solved insofar as the layout is concerned by using this table. We have prepared a plan based on a typical drilling pattern, using 18-ft. spacings and loads of 500 pounds per hole. The first drawing shows the conventional method of distribution used on most operations. You can see from the table that 500 pounds will propagate 18 feet, so you know that with this layout a premature in hole No. 1 will fire every pound of explosive on top of the quarry. However, again referring to the table, we see that by grouping four charges in one pile we can get a safe spacing and still maintain uniform distribution. Four spaces between holes total 72 feet, and the 2,000 pounds containing the charges for these four holes will fail to propagate 70 feet, which we are sure you will agree makes a much safer layout than the first one.

These piles are kept a minimum distance of 25 feet from the line of holes, preferably to the rear. However, if this is not possible, modifications of this scheme can be devised so as to accomplish the same objective. This 25-ft. separation is important; in fact, it is one of the principal factors comprising the whole plan of increased safety. Experience indicates that prematures are most likely to occur in or near the particular hole being loaded. If there is no dynamite closer than 25 feet from the hole collar, then no propagation can occur.

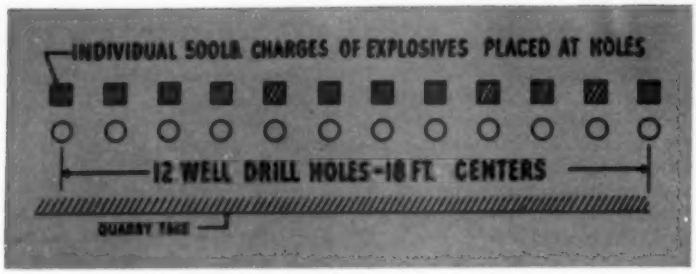
An alternate scheme illustrated by the third drawing shows 100 pounds piled at each alternate hole. This is for convenience in loading and making up primers. According to the table, these 100-pound quantities cannot propagate each other, nor can they propagate the main piles located 25 feet away. However, one precaution is recommended for these 100-pound piles at alternate holes. They should be kept at least six feet from the hole collar. Again actual tests were made as a basis for this recommendation. These tests showed that the firing of heavy charges in churn drill holes, both stemmed and unstemmed, would not detonate dynamite lying on the surface at distances considerably less than six feet from the collar of the hole. This was done to be certain that under normal conditions a premature occurring down within the hole itself would not set off the dynamite on top, a few feet to one side.

It is of utmost importance, however, that the "Primacord" branch line in the hole should be cut from the spool as soon as the line is in place in the hole. The spool should then be moved several feet away. Failure to do this has been responsible for a number of accidents that would not have occurred otherwise, so this precaution cannot be emphasized too strongly. The spool may still contain several pounds of PETN core, a very powerful explosive which can set off dynamite several feet away. Of course, if a premature occurs in the hole and the spool is still attached to the down line, it will be fired with the explosive in the hole. If it is cut off, the force of the explosion being directed upward will normally not shoot any dynamite if it is at least six feet away on top of the ground.

The objection has been raised that

COLUMN 1	COLUMN 2	COLUMN 3
POUNDS OF DYNAMITE (CAP SENSITIVE)	DISTANCE DETERMINED-FEET FOR 100% DETONATIONS	DISTANCE DETERMINED-FEET FOR 100% FAILURES
50	9	21
100	11	25
200	13	32
300	15	37
400	16½	41
500	18	44
750	21	50
1,000	22½	55
1,500	26	64
2,000	28½	70
2,500	31	75
5,000	43	96
10,000	54	123
20,000	69	156

• Table at right was compiled from tests made in remote section of Canada. It shows maximum distance at which a given amount of dynamite will fire another pile by propagation every time. It also shows minimum distance at which the dynamite will fail to fire another pile.



• Five hundred pound charges are piled at each hole drilled on 18-ft. centers. A premature in number 1 hole will fire all piles on the surface.

the distribution scheme we have just described is too laborious. It is alleged that the blast will take longer to load, and therefore the men will be exposed longer than if the individual charges are distributed at each hole. It seems to all of us that this type of reasoning is entirely false, since the increase in safety provided by the recommended plan is many times greater than the increased time of exposure of the men loading the blast. Actually, with a properly organized crew containing the minimum number of men required to do the job, we believe the exposure need not be any greater than with the conventional method. In the last analysis, it is up to each operator to make his own choice.

But in making this choice, he should keep in mind one very pertinent factor. Each time a serious explosives accident occurs, the particular state officials concerned, and the lay public in general, immediately become imbued with the idea of more regulation. These bodies are seldom concerned with the practical aspects of the situation; as a general rule, they are simply interested in satisfying public clamor, regardless of the cost to the operator.

I could quote several examples to illustrate my point, but one will serve the purpose just as well. Several years ago, a serious explosives accident occurred on a quarry blast involving propagation on the surface and resulting in a number of fatalities. As a result, the state authorities were insistent on promulgating a code requiring dynamite charges to be piled 400 feet back of the holes. Obviously such a rule would work a terrific hardship on the operators, but it was only by citing to the state the results of our research work just described that they agreed to drop this requirement.

Legislation regulating the use of explosives is pending in several states at this moment, and with each and every accident, these regulations tend to become more restrictive. Our function as explosives manufacturers has been twofold: first, to try to guide the lawmakers along safe but practical lines; and second, to try to advise and educate the operators in sound practices. Neither of these is an easy task, but we are sure you will all agree that if the second job is properly done, the first may not be necessary. Unfortunately, there are a number of complacent operators who make this a difficult undertaking. Too many believe, "It can't happen here"—especially if they have never had a serious accident; but I repeat to you men here today the old adage, "A word to the wise is sufficient."

Use of Blasting Agents

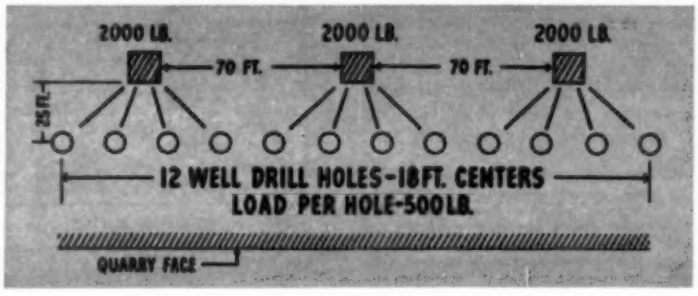
The story of explosives distribution for a quarry blast is incomplete without some mention of blasting agents, of which our "Nitramon" is an example. Our principal interest at the moment is to see how it compares with dynamite from the standpoint of distribution on the shot. When propagation tests were made on dynamite to develop a dynamite table, parallel experiments were carried on with "Nitramon." This work produced the tabulation we have here, and from it we can check the propagating distance for the 500-pound load used a moment ago in the hypothetical dynamite blast. We have 100% failures to detonate "Nitramon" at 10 feet, so for this shot we can place all the charges at the individual holes 18 feet apart with entire safety.

The special primer used with our blasting agent is somewhat more sensitive and is classed as an explosive. It is kept several feet away from the "Nitramon" pile and from the hole, but otherwise no special precautions are needed.

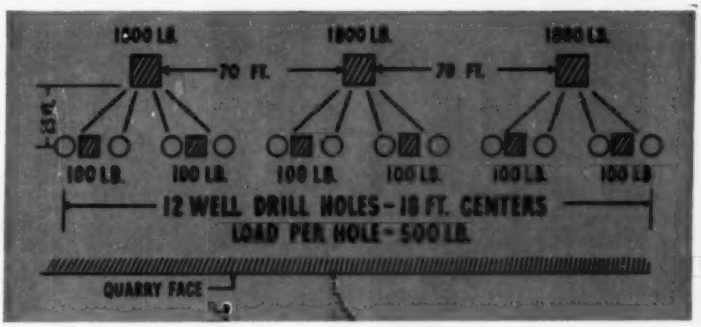
Again referring to the table, we find that our individual charges of blasting agent can go as high as 2,500 pounds per hole without danger of propagation at 18 feet. With only 3 feet more spacing at 21 feet, we can load 5,000 pounds per hole and still distribute the charges at each hole in the usual manner. Such a blasting agent, then, offers by far the best solution to the operators' safety problem, eliminating all distribution hazards without any special handling, such as described with dynamite. Experience has shown that with the grades now available, "Nitramon" blasting agent is applicable to almost every conceivable quarry problem. By way of summary, then, we have at hand two methods of virtually eliminating the distribution hazard: First, a relatively safe, if somewhat more laborious, method of handling dynamite on the quarry top, and second, a blasting agent with its attendant safety benefits.

There are a number of other subjects which we believe fall within the scope of "What's New in Explosives Safety," and the first of these deals with short-interval delay blasting. All of you are doubtless familiar with the general procedure and the very beneficial results that are being accomplished, especially with respect to vibration and general primary breakage.

Until late last year, there were two



• Plan at right shows charges for four holes grouped in one pile. A premature will not fire the 2000-pound piles.



• A third lay-out places 100-pound piles at alternate holes for convenience in loading and making up primers. Here, too, larger piles, more widely spaced, will prevent propagation firing in the event of a premature.

methods available for short-interval firing, and these are still in use. The first consists of short-interval or millisecond delay electric caps. The second is the electrically-driven timer, which energizes a number of circuits in sequence.

When using the timer, instantaneous caps are attached to "Primacord" down lines at the collars of the holes at the last minute before firing. This involves the minimum duration of exposure time to any hazards there might be arising from stray currents or lightning. A safer method, even, than this and one that is growing in popularity is to first attach the cap to a short "Primacord" tail. This is kept away from the down lines in the holes until the blast is ready. At the last moment, after all personnel and equipment are in the clear, the tails are tied to the down lines with a square knot, thus providing the very minimum exposure to electrical hazards before firing the blast.

Firing Small Holes

Short-interval delays are attached to the "Primacord" down lines on surface in a similar manner. A more hazardous procedure, of course, is to use them for direct priming of the charge in the hole. This is the universal method when firing wagon drill and other small-diameter holes at short intervals. It is used to a much lesser extent in large-diameter churn drill holes, because in such cases the spacings are generally large enough to allow short-interval firing from the surface of the ground without risk of cut-offs. You can readily understand, of course, that with electric caps of any type placed down in a bore hole in a charge of high explosives, the hole is subject to the potential hazard of premature firing during the entire period from the moment it is loaded until the blast is finally made. This premature may be caused by lightning and to a much lesser degree by stray currents. Also, with a cap in the charge, accidental detonation is more likely to take place if a misfired charge is being dug out by the shovel.

Recognizing the need for greater safety in short-interval delay firing, we have developed the "Primacord" MS Connector. This device provides an interval averaging 17 milliseconds without the use of any electrical element whatever. It is equipped with a short "Primacord" tail at either end, by means of which it can be tied into the trunk line wherever desired. This is not done until the blast is to be fired, and even during the short period of normal exposure, the hazard of a premature from an electrical source is practically nil.

The demand for these connectors by the quarry industry in general has been tremendous, which indicates that they are fulfilling a definite need. Of course, the short-interval delay caps will always be in demand for small-diameter holes for reasons of cost and because the close spacings require direct priming of explosives charges to minimize cut-offs from ground movement. Also, the timer will still be in the picture where a more accurately controlled shorter interval is felt to be necessary and where surface noise from "Primacord" is considered a nuisance factor.

A safety talk on explosives would not be complete without a discussion of the various hazards incident to electric firing and what is being done about them. In this category I want to mention briefly prematures or accidental detonations from static, lightning, and short wave radio.

We have known for a long time that static is quite a serious hazard in dry climates, such as are found in the southwest. Low humidity promotes the accumulation of a static charge, which is further aggravated during a sandstorm. The result has been a history of prematures from this source, especially in seismograph exploration for oil. The incidence of prematures from static is on the decrease.

A similar situation can develop if electric caps are being used during a cold, driving snowstorm. Apparently the particles of snow under such conditions carry small charges of static that can accumulate until enough potential is built up to fire a cap. We know, too, that in the case of an airplane flying through a snowstorm sufficient static can collect on the wings to give off a corona discharge having a sort of luminous appearance around the edge of the wings.

Judging from the number of caps used successfully in cold climates, we believe the danger is slight, but it is a possibility, nevertheless. The remedy is—don't use electric caps during a driving snowstorm in a dry, cold climate. We have for years advised against throwing out long cap leg wires on quarries. Several prematures have occurred while doing this, and we suspect that the static-charged steam particles from a steam shovel exhaust had something to do with it. There aren't many steam shovels around any more, but it's still not a good practice to uncoil long cap wires by throwing them out. If you insist on doing it, don't hold the cap in your hand.

Lightning is by far the most serious and widespread source of trouble in electric firing. This is not especially new, but nevertheless each year we receive many reports of new instances of prematures from this source. In spite of the fact that lightning is known to be a mad actor in connection with electrical blasting, many operators still insist on using cap firing of churn drill blast holes because of the idea that they get better results, especially in pulling bottom. This may be true in some cases; however, we know that in a 100-ft. churn drill hole, the detonation travels down the "Primacord" from top to bottom in only 5 thousandths of a second or 5 milliseconds where in most cases the burden on the hole does not move appreciably for anywhere from 30 to 50 milliseconds.

A statistical record of the number of such occurrences per year bears tes-

Continued on page 38

Big Red TD 24

TIGHT TURN AT THE TIP of old Cape Cod, a big International TD-24 crawler with a 21-yard heaped-capacity scraper wheels around to start another 1,800-foot haul on the new Mid-Cape Highway extension, near Truro, Massachusetts.

takes the Cape

BIG RED EQUIPMENT. Here are three of the five Internationals on this job, dozing and hauling the loose, shifting Cape Cod sand. In some bogs, peat has to be replaced with sand, and 50-foot piles driven in for stability of the roadway.

Makes tracks near Truro on sand-slowed highway job

Out near the tip of Cape Cod, where the Pilgrims saw their first tracks of redskins in the sand, today's tourists see the tracks of big red Internationals.

They're extending the Mid-Cape Highway, and where the land isn't sand, it's bog and marsh. It's so bad the S & M Construction Company, of Providence, R. I., won't let many of its vehicles venture off the pavement. But the Internationals charge ahead, moving nearly half-a-million cubic yards of sand to build three miles of road.

Pride of the whole show is "Big Red"—the TD-24—pulling bigger loads faster than any other crawler can.

And here's what an S & M operator says about it: "I wasn't on this rig very long before I found out it was mighty nice to handle. I really pull plenty of dirt!"

"Big Red", with 148 maximum drawbar horsepower and up to 7.8 mph, has more power and speed than any other crawler on the market. And it has finger-tip maneuverability to make pivot turns, feathered turns, and turns with power on both tracks.

All this means a faster work-cycle and more paydirt moved per day.

Ask your International Industrial Distributor for details on the TD-24. Ask him, too, about his fast, ready service and speedy parts delivery. Get all the answers . . . and you'll be a TD-24 man from then on in!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

INTERNATIONAL

POWER THAT PAYS

INTERNATIONAL HARVESTER

Explosives Safety

Continued from page 35

timony to the fact that many people have still not learned this lesson of safety. Everything by the way of study and development is being done that can be done to make caps more lightning-resistant. However, at the moment, we see but little prospect of anything on the order of a major improvement. Unfortunately, in many of these instances involving lightning, the men were allowed to stay on the blast until the storm broke, and, of course, fatalities were the result. We can't give you a safe electric cap to meet this hazard, but we can give you some advice.

First, use "Primacord" wherever possible. There is not a single case on record wherein "Primacord" was ever fired by lightning, and we seriously doubt that this can occur. If you insist on bottom detonation, as promoted by the advocates of electric firing, we can give it to you with "Primacord" and "Nitramon" (not with standard explosives).

Second, if you must use electric firing, as in wagon drill or jackhammer shooting, use a radio or some other detection device to warn of the approach of a thunderstorm and get the men off the job in time. No protection, such as a shunt, burying the ends of the wires or hooking them in series, is effective in the presence of lightning. A direct hit is not necessary to set off caps; a strike anywhere in the vicinity will do the job.

Effect of Short Wave

By far the newest hazard to electric firing is short wave radio. At least one serious accident occurred from this source about three years ago when a 50-watt sending station on a seismograph boat fired a charge on board. Since that time, a tremendous amount of interest has arisen regarding the possible danger of blasting near broadcasting stations. Of course, this has been due principally to the amazing increase in the use of portable short wave equipment in all sorts of vehicles.

The radio hazard problem in electric blasting may be divided into three parts: first, transporting electric blasting caps in vehicles equipped with two-way radio; second, transmitting with mobile equipment in the vicinity of electric blasting operations; and third, carrying out such operations near broadcasting stations, either commercial or the central transmitter in a mobile set-up.

POUNDS OF "NITRAMON" or "NITRAMEX"	DISTANCE for 100% FAILURES FEET
100	6
500	10
1,000	12
2,500	17
5,000	21
10,000	26

• Here is the startling table for piling blasting agents, such as du Pont's "Nitramon" and "Nitramex" used in determining this data.

Our conclusions and recommendations are based on tests that we have made ourselves, data supplied by Motorola, Inc., and RCA, and information submitted by certain of our customers who have used the lamp test we recommend. This lamp test, incidentally, has been approved by both Motorola and RCA.

We believe there is no hazard in transporting electric blasting caps in their original cases or cartons in vehicles equipped with two-way radio. This is principally for the reason that the wire coil lengths are far shorter than one-half the radio wave length. Nevertheless, we recommend that the caps be carried in a metal container lined with wood, rubber, or similar material. The metal, of course, effectively shields the caps against radio-induced currents. We also advise that no transmitting be done while the caps are either being put into or taken out of the container.

In the tests that have been made to date, even the highest powered mobile transmitters have failed to produce enough current to fire a cap at a distance greater than 10 feet. These tests were made under the worst conceivable conditions; for example, with wire lengths exactly equal to one-half the radio wave length and held parallel to the antenna. In our opinion, however, there should be a large margin of safety. Consequently, we are recommending that no transmitting with a portable set be permitted within 100 feet of an electric blasting operation.

Central broadcasting stations might conceivably represent a hazard at distances so great as one mile. This depends, of course, on the power, frequency, height of antenna, directional effects, and other factors. Our suggestion in this case is that no electric blasting be done in the vicinity of a fixed station until it has been established by a suitable test that no hazard exists. Our recommended test is this: place a No. 47 radio pilot lamp in the center of a straight piece of wire of a length in feet exactly equal to one-half the radio wave length. This length can be determined by dividing the figure 500,000 by the frequency in kilocycles. For example, if the set has a frequency of 30 megacycles, which is 30,000 kilocycles, the half-wave length would be 500,000 divided by 30,000, or 16⅔ feet. Next, hold this assembly 2 or 3 feet above the ground in a position parallel to the antenna. The lamp will light to full brilliancy with a current of 0.15 ampere, which is about half the minimum firing current for any electric blasting cap manufactured in this country. However, we strongly advise against electric blasting, if any glow at all is observed.

You doubtless realize that we do not pretend to be radio experts. However, the demand for information on this problem has been so widespread that we found it necessary to investigate the situation from the standpoint of blasting safety. All of the evidence we have accumulated thus far indicates that if the precautions just outlined are strictly followed, there will be no chance of a premature due to radio-induced current.

In electric firing, as in all other kinds of firing, our main concern for

over-all safety should be to fire the blast in a safe, dependable manner. In other words, we want to fire the blast at the intended moment, not before, and in a manner that will insure complete detonation of all holes. We know that none of you relishes the prospect of digging into misfired holes containing dynamite, with or without a cap in it. Here are what we consider the three prime essentials for such a system.

First, we have Unit No. 1, the power entrance switch. Any good double throw safety switch will do. The pertinent features are the positive break provided by this jumper cord between the switch and the blast and, also, the grounding of the switch box, which is the only ground used on the entire system.

Unit No. 2 consists mainly of our specially constructed blasting switch with the other accessories, including the jumper cord, pilot light on both the hot and cold side, etc. The main feature of this switch is that it is a quick make-quick break, spring-actuated, oil-immersed type, providing an automatic short on the blasting lines when it is in the "off" position. This switch is not especially new, as it was designed several years ago mainly for underground work. However, it is equally adapted to electric firing anywhere, and in the interest of safe blasting in quarries, we are recommending this system.

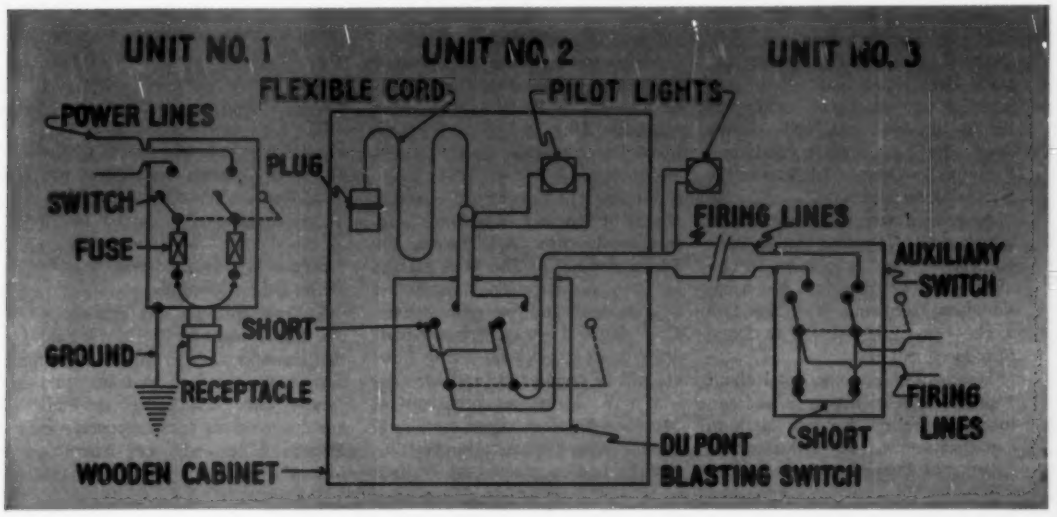
Unit No. 3 represents one or more auxiliary switches installed between the blast area and the firing switch for safety or to tie in several separate sections of a blast being fired at the same time. This is primarily a regular double pole, double throw Square "D" type with a shorting bar in the down position. A number of operators, however, are adopting our regular blasting switch for this purpose also, with a slight modification of the handle which permits locking it in both the "off" and "on" positions instead of in the "off" position only.

It is frequently desirable to fire large electrical blasts in quarries or on construction jobs that are beyond the capacity of a regular push-down battery. Shots containing over 250 caps are in this category, which means that they must be fired with a power line or by means of a portable power or lighting plant. It happens quite often that neither of these is readily available, and to meet this need we have devised a new type condensor-discharge blasting machine. This battery is still under development, but we have a model which will fire well over 1,000 caps in parallel series.

There are only two more points that should properly be included in this talk. The first deals with a hazard that has just come to our attention relatively recently. On a Pennsylvania turnpike job, the dynamite in a 6-foot wagon drill hole exploded just as the shooter had finished loading and stemming and was bending over the hole coiling the cap wires. Lightning, stray currents, and static were ruled out of the picture because of local conditions. However, subsequent investigation developed that the material being drilled was very hard and drilling speed was slow, even with the carbide insert bits being used on the job. Steel breakage was high, especially in the threads at the bit end, and we have found that general experience indicates this might be expected under such conditions.

Evidence points to the fact that the bit broke off in this hole shortly before it was down to depth. The driller allowed the machine to run for several minutes with the broken steel pounding on the bit, which raised the bit temperature to several hundred degrees, far above the ignition point of dynamite. We know that the shooter loaded the hole only a few minutes after the driller moved off and presumably before the bit had a chance to cool. As a result, the dynamite was set on fire, and since it was under confinement and contained a cap, it was bound to explode a short time later. The use of carbide insert bits has evidently introduced a new problem in steel breakage. The same conclusion was reached as a result of tests described at the AIMME meeting in St. Louis. Under the circumstances, it behooves us all to use every precaution to avoid loading dynamite on top of a hot bit left in a bore hole from drilling operations.

An old hazard that is still with us is the danger from flying material. Always allow for the unexpected—even though the blast is planned and loaded perfectly. Unseen weaknesses in the rock structure can and do cause wild spurts of flying material that are still taking their annual toll.



• Diagram below shows a power blasting system laid out with a du Pont blasting switch.

Wallace H. Puckett

Wallace H. Puckett, senior vice-president of the construction and engineering firm of Morrison-Knudsen Company, Inc., died on Sunday, Dec. 16, 1951 in a Portland, Ore., hotel. He was 68.

Often called the "old dirt maestro" of Morrison-Knudsen, Mr. Puckett was a veteran construction man. He directed many of the reclamation projects that brought water to the semi-arid lands of the West. He built logging roads and highways in Oregon, Idaho and the Southwestern states.

Associated with Morrison-Knudsen since 1923, Puckett died in Portland on his way to present service awards to veterans of Morrison-Knudsen Company who now are working at Lookout Point Dam, near Eugene, Ore.

He checked into the hotel about 8 p. m., went to his room and immediately called the desk clerk to say that he was ill. A doctor was called, but Puckett had succumbed by the time he arrived. Death was attributed to a heart attack.

Puckett is survived by his wife, Mrs. Martha Puckett, Boise; a daughter, Mrs. Paul Vernon, Boise; his mother, Mrs. Mary Puckett, Adams, Tenn.; and a sister, Ida Puckett, also of Adams.

He served as Idaho president of the Associated General Contractors of America in 1946. A member of the Boise Elks, he lived at his farm home on Cloverdale Road, west of Boise.

Puckett had been in general charge of Morrison-Knudsen's post-war construction in Idaho for the Idaho Power Co. The work started in 1946 and included construction of four dams and five powerhouses. C. J. Strike Dam, Morrison-Knudsen's latest project for Idaho Power, will be completed in 1952.

H. W. Morrison, president of Morrison-Knudsen Company, paid the following tribute to Puckett:

"The sudden passing of Wallace H. Puckett ended the career of one of the greatest of construction men, for whom there can be no replacement in our company. Hundreds of construction men he has trained as able leaders will share my deep personal grief and sense of loss."

Puckett was born on his father's farm at Adams, Tennessee, September 3, 1883, and took his first job in the construction business at 18. He worked on a surveying crew, then in railroad construction for Maney Brothers of St. Louis, Mo., and Wells Brothers & Brown.

Puckett became a subcontractor after several years as a superintendent for Maney Brothers. As an independent contractor, he completed several important projects in Idaho and Oregon. These included a drainage project that was part of the construction of Owyhee Dam in Oregon.

In 1923, he joined with Morrison-Knudsen in forming a corporation known as the W. H. Puckett Company. The firm played a leading part in construction of the drainage system in the Boise Valley. In 1928, the W. H. Puckett Company was merged with Morrison-Knudsen Company.

Known as one of the hardest workers in the Morrison-Knudsen organization, Puckett possessed the rare executive capacity that senses the potential worth of a man quickly and accurately. He liked men who knew valuable construction equipment and used it intelligently.

A pioneer in the development of the West, Puckett believed that construction work is basic and fundamental, seeing in it the evidence of man's progress.

The high esteem in which Puckett was held by other members of the Morrison-Knudsen organization was seen during his illness in 1942. Thirty minutes after doctors called for blood donors, men and women of Morrison-Knudsen jammed the halls of St. Luke's hospital.

Puckett lost his left arm in a blasting accident in 1911. It is said that he spit out a pill meant to deaden the pain, so that he could "know what was going on." His nurse during his convalescence was Martha Miles, who later became Mrs. Puckett.

Visual Flags Boost Efficiency

• Clark Tope, one of the key superintendents for Peter Kiewit Sons Co. at March Air Force Base, demonstrates the type of visual aid flag which has helped a lot to promote efficiency on PKS jobs. Superintendents are easy to find when their pickups carry flags such as these. The white center stripe shows that this pickup belongs to a superintendent. Foremen's flags are in solid color.

by Ray Day

THE long standing problem of how to find a busy foreman or superintendent on a big construction job has finally been solved by Peter Kiewit Sons Co. with a simple system of flags attached to cars and pickup trucks of key personnel. Visible for distances up to a thousand yards, the flags are made in key colors which denote at a glance where each supervisor is located.

The flag system, which was first developed at Garrison Dam in North Dakota, closes the gap between nothing at all, and expensive radio installations. On large dams, airfields, and other such concentrated jobs where operations are not strung out for miles, the flags have special value.

One of the best examples of how the flags boost efficiency is at March Field near Riverside, Calif., where Kiewit has a $6 million airport contract under way for the Los Angeles District of the Corps of Engineers. Herb Studer, general superintendent for the Kiewit Co. imported the flag system from North Dakota to furnish identification of all key personnel.

Studer himself uses a standard checkered Air Force warning flag on the back end of his company car. Every one of the basic airport operations is assigned a color, as follows:

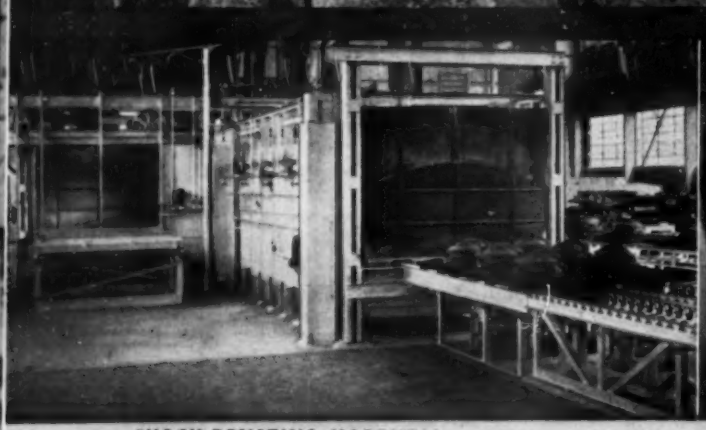
Excavation	Red
Asphalt Paving	Green
Portland Cement Concrete Paving	Orange
Mechanical Force on mechanical installations	Black
Structures	Blue
Master Mechanic's crew	Yellow

If the key man involved is a superintendent of any of these departments, his flag is 3 by 4½ feet in size, and has a white center stripe 10 inches wide. Foremen carry solid-color flags smaller in size.

According to Studer and his key personnel, the flag installation has saved a great deal of wasted energy, made it easy to locate key people at a glance, and reduced the amount of exposure time to automobile travel around the project roads. The latter is no small item, because needless traffic adds expense to the job costs, exposure to danger to people driving around, and congests the haul roads which are designed primarily for construction vehicles on pay items. After only a few days time, everyone was familiar with the various flags and the workmen soon learned to recognize their foreman or superintendent. The flags retain their color for months at a time and require little maintenance.

The system has only one disadvantage: it cannot help a man who is color blind.

SMOOTH, STEADY OPERATION of this ¾-yd. 22-B dragshovel is shown during finishing work on a large basement in Los Angeles, Calif.



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MODERN FOUNDRY METHODS are exemplified by this electric furnace in operation. In its own foundry Bucyrus-Erie has pioneered in the development of steels especially suited for excavating equipment.

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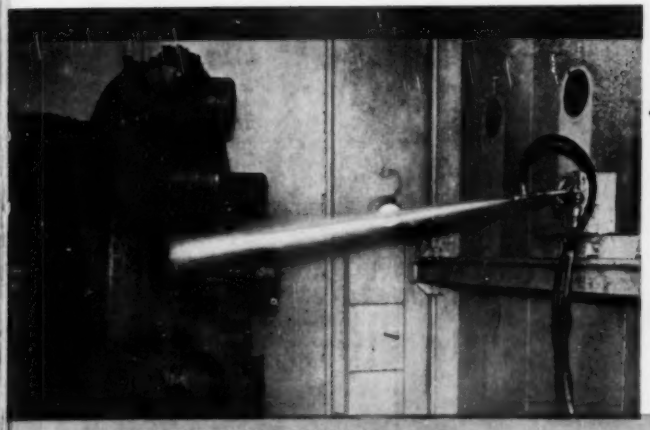
FOR 71 years the most-wanted excavator line in the contracting field—that's Bucyrus-Erie! Such year in, year out preference reflects the quality built into every Bucyrus-Erie machine — the result of the industry's largest full-time engineering staff, with an unmatched background of field experience, plus thorough laboratory tests of all materials. Such rigid manufacturing controls combine with careful field testing to produce a machine that **you know** will perform exactly as specified.

To a contractor engaged in the most extensive building program in America's history, this close attention to quality means that you'll have a machine that will take tough going in stride for many years to come . . . one that will offer fewer maintenance problems — produce higher output records with less downtime.

While heavy defense demands are in effect upon manufacturers of excavating equipment, it will pay you to see your Bucyrus-Erie distributor now for the delivery picture on this "quality proved" line of 3/8- to 4-yd. gasoline, diesel and single-motor electric excavators. They're worth waiting for!

307E51C



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News from the Field

Dozers Clear Snowbound Streamliner

Diesel track-type tractors owned by two contractors of Sacramento, Calif., made possible the removal of the *City of San Francisco*, stalled by deep snow at Yuba Gap in the Sierra mountains.

Railroad flatcars carried the tractors as far as Emigrant Gap, five miles west of the stalled streamliner. From there they were moved to the scene over a stretch of U. S. highway 40 cleared by the state highway department. Bulldozer blades were lowered on the job, and the machines went to work pushing snow packed in many places to a depth of 15 feet.

The Southern Pacific train had been due in San Francisco on Sunday, the 13th of January and had 177 miles of its run left to complete. A snowslide trapped it at the 5,500 foot level. Removal of passengers and crew was completed when the blizzards temporarily abated on the following Wednesday, leaving the tracks blocked by the streamliner and four rotary railroad snowplows which had stalled in a rescue attempt.

Four Caterpillar Diesel tractors — three D8s and one D7 — went to work Friday, the 18th of January, clearing snow from around the passenger train and stalled snowplows. After an all-night session the streamliner was ready to be moved. The three D8 tractors teamed up to move the locomotive power units and continued on the job as baggage and passenger cars were uncoupled and moved one-by-one. By Saturday noon, the train was freed from the grip of ice and snow.

Contractors involved in the work were A. Teichert & Sons Inc. and Lentz Construction Co., both of Sacramento. Each supplied two machines equipped with bulldozers and two veteran operators.

On Sunday morning the first relief train traveled the newly-cleared route, bringing relief to towns stranded by what was called the worst snow in the area for 62 years.

St. Lawrence Seaway Nears Showdown

Since 1897, when the first joint Canadian-American commission was appointed to study the problem, the St. Lawrence Seaway project has met with firm opposition and strong support. With Canada ready to start the project without the support of the United States, a "yes" or "no" decision must be arrived at soon in Congress.

If opposition forces in the south and east keep the United States out of the plan, the Canadian version of the seaway would be an abbreviated one. It would be on the Canadian side of the international border and would stop in Lake Erie. Thus many midwest ports would be left "high and dry."

● Three tractors teamed up to pull locomotive power units loose from the grip of snow and ice. A railroad locomotive crane arrived to render additional assistance to *City of San Francisco*, snowed in for six days after a snowslide trapped it only 177 miles from its destination.

Although nature has provided free most of the deep route, it is estimated that construction of the proposed joint project would take five to seven years depending on world conditions. Of the total cost of 818 million dollars, America's share would be $566,794,000. Canada with one-tenth the population of the United States would pay $251,269,000.

Perhaps the biggest reason for building a seaway deep enough to allow bigger and more ships to travel between the Great Lakes and the Atlantic Ocean is iron ore. The Mesabi iron ore range in Minnesota has only 10 to 20 years of high grade production remaining, depending upon the rate of mining. There are great quantities of low grade ore (taconite) but concentration so far has been slow and costly.

The recent discovery of huge iron ore deposits of greater richness than Mesabi ore in Labrador and Quebec, 300 miles north of the Gulf of St. Lawrence, has helped to bring the seaway issue into the limelight (*Excavating Engineer*—Sept. 1951). This location is on the eastern side of the St. Lawrence river's shallow bottleneck. The canals and locks now existing cannot handle the big ore boats which are needed to transport the ore to Lake Erie.

If the joint project is approved it would require the moving of 76.5 million yards of dry dirt and 23.5 million yards of dredging. In addition there would be much work in the lake ports such as docks, piers, warehouses, rail lines, roadways, etc. For example it is estimated that Milwaukee alone would have to devote about $5 million for enlarging facilities.

The principal opponent of the legislation, Senator Connally (Dem., Tex.) objects to "spending about a billion dollars for a project that would be frozen up for five months of the year and would involve building a canal through foreign territory."

In strong support of the bill President Truman said, "It is inconceivable . . . that congress should allow any local or special interest to divest our country of its rightful place in the joint development of the St. Lawrence river in the interest of all the people of the United States."

Worker's Clean-Up Idea Causes Severe Injury

In the current issue of the Safety News Letter, the National Safety Council relates the story of the machine operator who thought he found a short cut.

This operator in a woodworking plant, covered with sawdust at the end

Preferred power on booster and portable pumps, lighting plants, portable power tools of wide variety for oil-field service — the world's most widely used single-cylinder, gasoline engines on equipment used by industry, construction, railroads, and on farms and in farm homes.

BRIGGS & STRATTON engines have, by far, more air-cooled power experience built into them than any other single-cylinder, 4-cycle, air-cooled engines — more than 30 years of continuous production. Briggs & Stratton Corporation, Milwaukee 1, Wisconsin, U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

of the day, decided to clean himself with compressed air. He held the nozzle 12 inches from the palm of his left hand.

When he opened the nozzle, the air under 80 pounds of pressure struck and entered the hand, and before he realized what had happened, his arm had been blown up "as big as a grapefruit," and was shooting with pain from the finger tips to the shoulder. The most agonizing pain was in the head, the feeling being as though the top of the head was about to be blown off. This feeling was so real and the pain so intense that when help reached the young man, he actually was endeavoring to hold the top of his head in place.

And the plant surgeon says it could have been worse. Had the air forced its way into the blood stream, it would have made its way to the very small blood vessels of the brain, there causing a clot which would have burst the vessels and caused death.

The moral is obvious. A compressed air hose is as dangerous as a gun—and a gun is nothing to clean your clothes with—or use in horse-play with other employees.

Charles S. Ackley

Charles S. Ackley, secretary of McKiernan-Terry Corp., manufacturers of pile hammers, heavy machinery, and special process equipment, died on Dec. 16, 1951 after a brief illness at the age of 78.

Mr. Ackley had been associated with McKiernan-Terry and its predecessor companies for 43 years. In 1908 he was one of the founders of Terry Core Drill Co., which he was instrumental in merging with McKiernan Drill Co. to form McKiernan-Terry Drill Co. in 1910. He also took part in the successive mergers with additional companies which resulted in the formation of the present McKiernan-Terry Corp. in 1929.

Mr. Ackley served as sales manager with McKiernan-Terry Drill Co., and upon formation of McKiernan-Terry Corp. he was elected vice president and secretary. He remained actively connected with the corporation up to the time of his death, being secretary and director at that time.

Mr. Ackley had several inventions to his credit, including an electrical bottom-hole heater for oil wells, and held patents on processes for soil solidification. He is survived by his widow, a daughter, two brothers, a sister, and two grandchildren.

Earmark $18 Million for Pennsylvania Dam

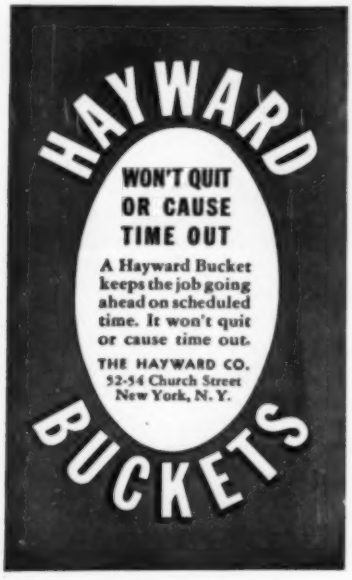
Pennsylvania's general state authority has approved the projected construction of a flood control dam and reservoir on the first fork of the Sinnemahoning Creek on the West Branch of the Susquehanna River.

Recently enacted state legislation increasing the authority's borrowing capacity, with $25 million of the increase earmarked for flood control, made it possible for the agency to approve the project.

An engineering report estimated actual construction cost of the dam at approximately $10.5 million without the cost of land, engineering, bond interest and authority overhead. The authority made a financial allocation of about $18 million to take care of all possible contingencies and assure ultimate completion of the dam.

Requiring about a year to design and two years to build, the dam will be a rolled earth embankment with a maximum height of 164 feet and a length of 1,420 feet.

In announcing the authority's approval of the project, Governor Fine declared: "One of the great regions of Pennsylvania, historically and economically, is the Susquehanna River valley. Anything which advances the welfare of this region is bound to benefit every section of Pennsylvania."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A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
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BUCKETS

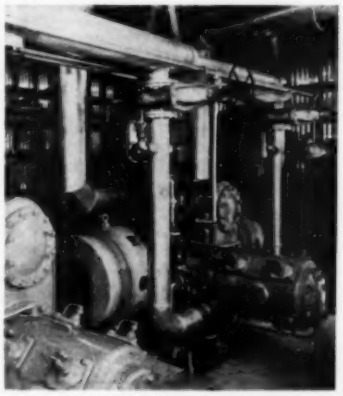
Three Air Compressors Handle Frisco Tunnel Job

Three Ingersoll-Rand air compressors, each driven by a General Electric 150 hp close-coupled synchronous motor, provide power to operate more than 100 air tools, four hoists, and four muckers used in the construction of the new Broadway tunnel in San Francisco.

The motors are mounted on the frames of the compressors, reducing the cost of the foundations. This arrangement also simplifies the wiring and pipe-fitting associated with the installation of compressor units.

All jack hammers, spades, pavement breakers, vibrators and air drills used on the $5,500,000 project are operated from air supplied through a 6-inch pipe running from the compressors located four blocks away.

The 3,400-foot Broadway tunnel is a twin-bore vehicular tube with two lanes and two sidewalks in each direction. While the tunnel will be 3,400 feet from portal to portal, including the portion under the ventilating building, the enclosed bore will be only 1,660 feet.



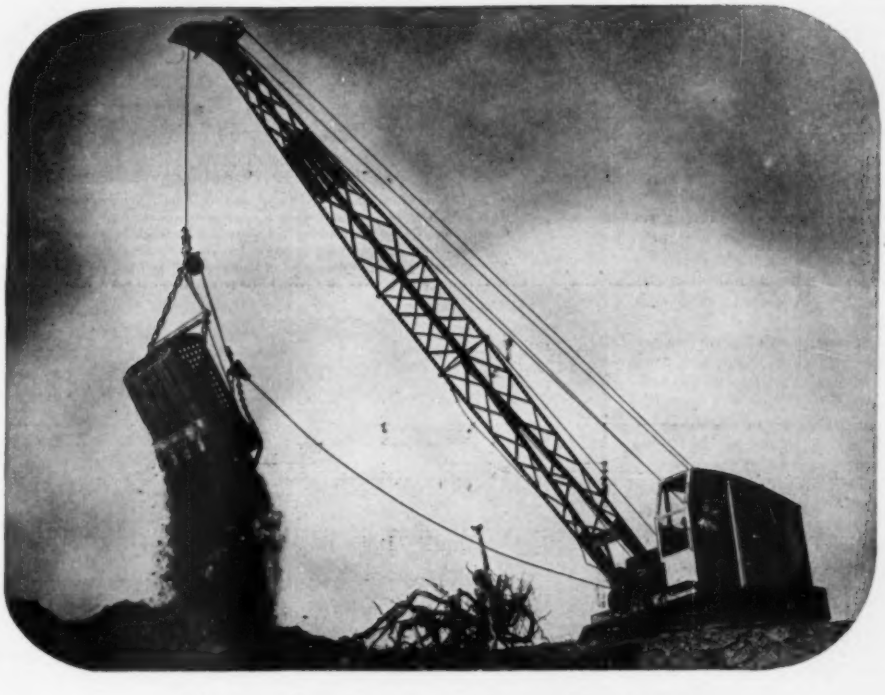
• Each of the three compressor units has a piston displacement of 973 fpm. They operate 24 hours a day, five days a week as the two-year project passes the half-way mark.

Earthmovers' Meet in April in Peoria

The third annual earthmoving industry conference will be held April 9 and 10 at the Pere Marquette Hotel in Peoria, Ill. The central Illinois section of the Society of Automotive Engineers will again sponsor this activity.

The conference will begin the 9th of April with a keynote address by E. G. Swigert, president of the Hyster Co.

WIRE ROPE



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A banquet will be held that evening with the featured speaker being Dr. Henry H. Crane of the Central Methodist Church, Detroit, Mich.

Technical sessions of the two day conference will include papers on "The Steering of Track-Type Vehicles," "Utilization of Steel Castings in Earthmoving Equipment," "Salvage of Used Parts by Automatic Welding," and "Electrical Operation of Earthmoving Equipment."

N. J. Scrap Drive Starts

New Jersey highway commissioner Ransford J. Abbott recently inaugurated a state-wide campaign to marshall all road forces in the collection of scrap metal. The drive to aid in relieving critical metal shortages, particularly steel, is being undertaken by the highway commissioner in cooperation with the U. S. Bureau of Public Roads.

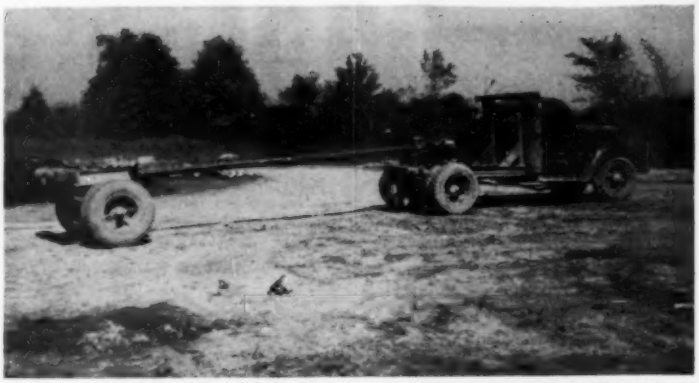
It was disclosed that all scrap metals will be sold through local dealers. Proceeds from the sales will go to the contributing source.

Abbott said that accumulated scrap metal recently salvaged at the Fernwood equipment depot of the highway department in Trenton amounted to approximately 30 tons. He said other highway yards were expected to increase this amount materially. "The purpose of the drive is to put idle scrap to work in an effort to materially increase the quantity of finished steel available to the public. If this can be done larger allotments can be made available for highway construction and other non-military uses," the commissioner said.

Present important highway projects have been brought to a standstill because of the lack of steel for bridges. Delivery on present allotments to the state highway department are from 12 to 18 months behind schedule. In addition to scrap iron and steel, copper, bronze and lead will be sought.

1951 Sees 72 Contracts Awarded in Alaska

A rundown on 1951 Alaskan command construction reveals that the year developed $250 million in building contracts spread among contractors from 12 states, British Columbia, and Alaska. The policy of providing open competitive bidding for the 72 contracts awarded brought out 359 bids of contractors from home offices as widely scattered as New York to San Francisco and Houston to Fairbanks. Largest project was construction of a central heating and power plant which went to S. Patti and MacDonald of Missouri for $10,320,000.



• Big 26-in. OD pipe gets fast and easy transportation because of this special pipe trailer. To eliminate weight only a tube connects ends of trailer. Williams Brothers Construction Co. is transporting this pipe just south of Youngstown, O. Below: Pipe is unloaded from railroad cars to trucks by another special rig. This crane was removed from original chassis and placed on four-wheel drive truck for maneuverability. Double axles and wheels keep the crane centered under heavy loads and keep it from sinking in mud.

Following the recent appearance of the *Prospectus of Construction*, an illustrated brochure listing 76 projects for the 1952 season with cost estimated at 170 millions, 287 newly interested contractors wrote for additional information. Current bidding is extremely active and with small as well as large contractors.

Administration of the vast Alaskan defense construction program is assigned the U. S. Army Corps of Engineers locally represented by Col. Lyle E. Seeman, Alaska District Engineer. At last season's peak in addition to a staff headquarters at Anchorage, there were 17 residencies and field offices throughout the territory which supervised construction under 87 contracts utilizing a labor force of 9,000. There were 1,167 Alaska District technical and administrative employees. An estimated 1,800 engineer personnel of stateside firms were engaged on 40 design contracts of which 15 were completed and 25 are still active.

Pump Bureau Elects Head

At the 13th annual meeting of the Contractors Pump Bureau, an affiliation of the Associated General Contractors of America, R. D. Houghton, president of the Rice Pump and Machine Co., Grafton, Wis., was elected chairman of the board of directors. The bureau establishes and maintains technical standards subscribed to by fourteen manufacturing members.

Disclose Top Appointments in Bureau of Mines

Two top-flight appointments in the Bureau of Mines were disclosed when a new chief of the Minerals Division in the Washington, D. C. headquarters, and a new director of the bureau's Region V, with headquarters in Minneapolis, Minn. were named.

Secretary of the Interior Oscar L. Chapman appointed Paul Zinner, regional director Region V at Minne-

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apolis, to the post of chief of the Minerals Division in Washington, succeeding Lowell B. Moon, who has resigned to accept a position in private industry.

At the same time, Chapman named Paul T. Allsman, who has been with the Denver office of the bureau, to fill the regional directorship at Minneapolis vacated by Zinner.

The Minerals Division is one of three divisions of the bureau at Washington.

Natural Gas Pipelines "Should Be Interconnected"

Frederic O. Hess of Philadelphia, past president and a director of the Gas Appliance Manufacturers Association told an executive session of the group recently, "Our best thinking should be devoted to a study of ways to integrate the gas-supply system and correct some of its growing pains."

For example, the various natural-gas pipelines, now comprising a network of 260,000 miles, he said, might be extensively interconnected to provide greater flexibility, particularly when seasonal or other emergency conditions place extra stress on the system. Such interconnection from Kansas City eastward to New England and south to Tennessee, he stated, would benefit the public, the national welfare and industry in general.

"We know how effectively such interconnecting and looping systems protect the electric industry against power failures, peak demands, unbalanced load factors, and excessive distribution costs," Hess said. "Why not the same system for gas?"

• Near Seoul, Korea, a U. S. Army Engineer puts his 180 hp dozer to work. It is a Tournadozer Model C.

George S. Bartlett Award Goes to Virginia Engineer

Claree Sutton Mullen, chief engineer of the Virginia Department of Highways, has been named 1951 winner of the George S. Bartlett Award for outstanding contribution to highway progress, one of the highest honors in the field of highway engineering.

The honor was conferred on Mullen recently at the 31st general meeting of the Highway Research Board in Washington, D. C.

The Bartlett Award winner is chosen annually by the leaders of three of the nation's outstanding highway organizations: the Highway Research Board, the American Association of State Highway Officials, and the American Road Builders' Association.

Mullen joined the Virginia Highway Department in 1908, shortly after graduating from Virginia Military Institute, Lexington, Va. He was one of the first engineers to be employed by the then two-year-old highway department. He has served continuously as chief engineer since 1924, the only man to hold the position in Virginia.

The award was established in 1931 in memory of the late George S. Bartlett, a national good roads advocate of 25 years ago. Mullen is the 20th man to be honored.

See Ample Rubber for 1952

The rubber industry's outlook for additional rubber supplies during 1952 is encouraging, according to John L. Collyer, president of the B. F. Goodrich Co.

"American plants producing man-made rubber are currently operating at the rate of more than 930,000 long

Dewatering 1500' of 8' x 14' deep sewer trench at a river crossing, this 4" Jaeger pump handled 40,000 gph at average speed of only 1200 rpm (10% to 15% lower speed than other pumps), and reprimed quickly, as needed, at 1400 rpm (compared with 1800 to 2000 rpm required to prime ordinary pumps). This is typical performance. Jaeger's larger shells and impellers, double priming action and use of largest engines applicable mean high efficiency, fuel economy, long life — in 1½" to 10" pumps.

See your Jaeger distributor or send for Catalog P-10

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COMPRESSORS • MIXERS • HOISTS • TOWERS • PAVING MACHINERY

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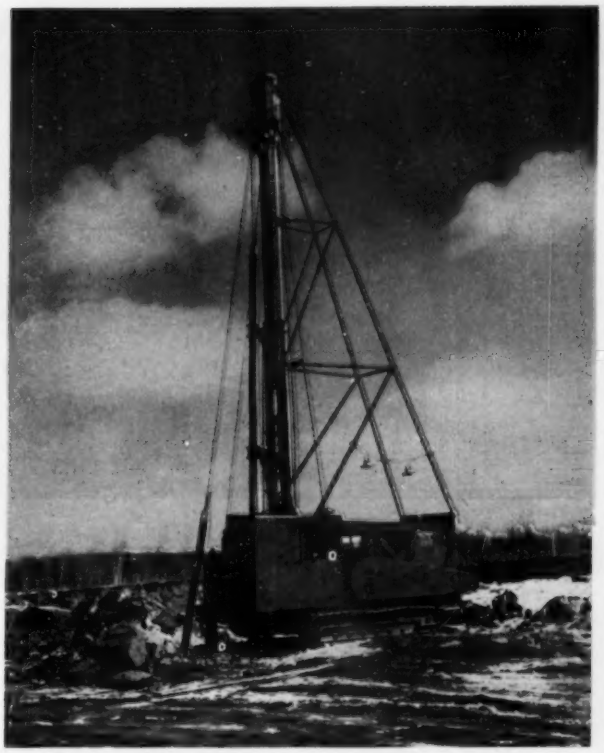
With Bucyrus-Erie Blast Hole Drills



50% SAVINGS IN PREPARATION COSTS (based on actual user reports). With Bucyrus-Erie rigs drilling larger (up to 12-in.) holes, fewer holes are needed, and these are widely spaced . . . fragmentation is more uniform and less secondary blasting is needed.

30% TO 50% FASTER TOOL CHANGING with a built-in tool wrench offered as standard equipment on the 27-T, 29-T and 42-T. Hand-operated on the 27-T and 29-T, power driven on the 42-T, the tool wrench is an important safety feature.

15% FASTER LEVELING. Users report a time saving of as much as 15% with hydraulic leveling jacks (standard equipment on 42-T, optional at extra cost on 29-T). The hydraulic jack eliminates elaborate ground preparation, blocking and cribbing.

And with rubber shock absorbers in the derrick head and rubber cushioned sheaves, Bucyrus-Erie drills provide that extra rock shattering snap that greatly speeds hole footage . . . reduces stress and jarring to the drill and derrick frame. Yes, the percentages work for you from every angle — speed, lower drilling cost, better fragmentation, lower drill upkeep cost — when you use a Bucyrus-Erie Blast Hole Drill.

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FOUR MODELS

22-T	5⅝"	to 6⅝"	holes
27-T	6"	to 6⅝"	holes
29-T	6"	to 9"	holes
42-T	9"	to 12"	holes

Gasoline or electric power is available for all machines . . . diesel for all except the 22-T.

BUCYRUS ERIE

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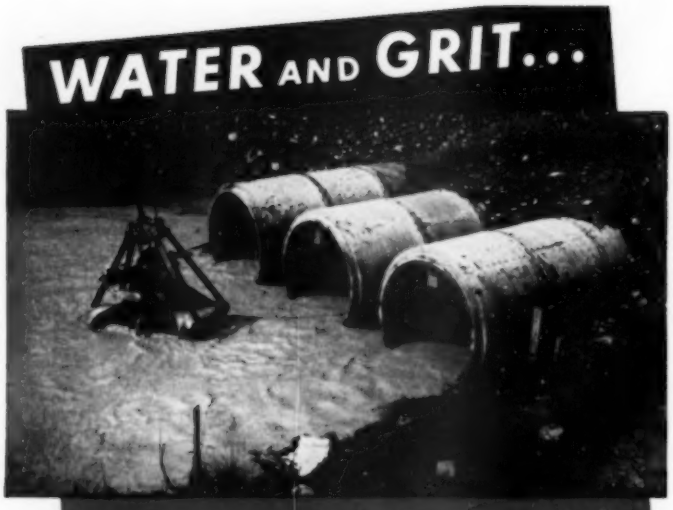

DON'T DAMAGE an OWEN BUCKET

With a less expertly designed bucket water would likely carry abrasive sand and grit into the bearings causing excessively rapid wear and deterioration.

Not so with an Owen.

Years ago Owen engineers learned the hazards of difficult underwater service.

And through experimentation and experience they designed bearings that retard these destructive forces.

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tons a year while the total rubber consumption in the United States during 1951 was about 1,230,000 long tons."

Collyer estimated that from 1,200,000 to 1,300,000 tons of rubber, crude and American-made, would be consumed during the coming year as a result of increased civilian and military requirements. About 65% of this, he said, would come from American rubber-producing plants which will undoubtedly surpass the previous production peak reached during World War II. Meanwhile, he added, we have enough rubber, both crude and man-made to meet all essential needs for a five-year all-out war, should such a catastrophe occur.

"While world conditions are highly unstable and probably will continue so for some time, we as an industry are in a favorable position to cope with the needs of a dual military-peacetime economy," the rubber company executive said.

He described the government's recent decision to stop allocating American-made general purpose rubber as an important step not only to the people of this country but to the industry as well.

"The move," he said, "probably averted a limited shortage of tires that would have resulted in some areas of this country next summer."

As a result of the lifting of rubber allocations, tire manufacturers should be able to produce at least 73 million passenger car tires during the coming year, or about 6 million more than were manufactured in 1951, Collyer estimated.

The American rubber industry was able to meet civilian requirements for rubber products while filling demands for defense production during 1951, the Goodrich executive said. He pointed out that the Korean war once again demonstrated the wisdom of a sound "national rubber insurance policy" based on a large measure of independence from foreign sources.

Launch River Basin Seminar at University of Wisconsin

The college of engineering and the departments of economics and political science at the University of Wisconsin have joined forces to present for the first time at the university a seminar in "river basin planning."

Taught by Prof. Arno T. Lenz, civil engineering, Prof. Martin G. Glaeser, economics, and Prof. Henry C. Hart, political science, the course was launched with the second semester which recently began.

Among the topics considered during the semester will be the natural potentialities of river basins; the methods

ot control available with modern engineering; the methods of evaluating the economic feasibility of the projects; the means of distributing and paying for the benefits including navigation, flood control, irrigation, water supply, and power; and the constitutional, legislative, and administrative considerations involved in river basin planning.

Studies will be made of the economic, governmental, and engineering experiences in such basins as the Tennessee, Columbia, St. Lawrence, and the Wisconsin.

• Discharge conduit pipe is being laid toward power house site for Shawnee Steam Plant near Paducah, Ky. Two "Cat" D8 tractors work on fill in left foreground. A P&H dragline, perched high at the right, is powered with a "Cat" D8800 engine. Four partially completed stacks form background.

Uranium Ore Mines Get $¼ Million Bonus

More than a quarter million dollars was paid out last year to uranium ore producers under the new incentive bonus program of the Atomic Energy Commission.

The graduated bonus arrangement (based on uranium oxide content of the ore) was established last June. It was one of several steps taken by the AEC to stimulate domestic production of uranium.

The payments have resulted in a sizable increase in the income of many small mining operators and have stepped up output of this raw material for the atomic energy program. Approximately one-third of the 70 mines which have been certified for bonus payments had no production prior to March 1, 1951.

Plan Construction Session at N.Y. Safety Convention

Building and highway construction engineers and contractors will discuss accident prevention in those fields at several meetings in NYC early next month.

Several sessions of the greater New York Safety Council's 22nd annual Safety Convention and Exposition, to be held for four days, starting the 1st of April at the Statler and New Yorker Hotels, will be devoted to the problems of these industries.

On the morning of the 1st of April the construction session at the Statler will take up these topics: "Safety in Highway Construction and Maintenance," by Raymond J. Thuon, secre-

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FOR BLAST HOLE DRILLING

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• McCarthy Vertical Drills adapt to any job where ordinary rock formations are to be blasted.

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Over-all height with tower reclining: 7 ft., 4 in. Wt.: 5,100 lbs. All McCarthy units can be operated with Gasoline, Diesel or Electric power units. Write for descriptive literature.

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BIGGEST
wire rope jobs . . .

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GENUINE
CROSBY CLIPS

Drop-forged, hot-dip galvanized wire rope fasteners
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SIZES FOR ALL WIRE ROPE
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tary, Cooney Bros., Inc., Tarrytown, N. Y.; "Buildings Can Be Constructed Safely," by Adam G. Friederich, president A. Friederich & Sons Co., Rochester, N. Y.; and "Integration of Safety Training in General Construction Industry," by George O. Carter, safety engineer, Zurich General Accident & Liability Insurance Co., Salt Point, N. Y.

On the same day in the afternoon the material handling session will meet at the Statler for a discussion illustrated with films, of manual handling of materials, by James E. Irving, vice president Irving Subway Grating Co., Inc., of Long Island City, N. Y., and mechanical handling by Donald L. Chance, safety engineer, Yale & Towne Manufacturing Co., Philadelphia.

On the 2nd of April the afternoon meeting at the Statler will deal with advanced techniques in accident prevention. "The Industrial Noise Problem," by Martin Hirschorn, president, Industrial Acoustics Co.; "Light — A Means of Promoting Safety," by C. L. Crouch, technical director of the Illuminating Engineering Society; and "Fatigue," by John V. Gimaldi, assistant manager, accident prevention department, Association of Casualty & Surety Companies are the topics up for discussion.

At the session the following morning at the Statler a panel discussion will be held with labor and management representatives and William L. Connally, director of the Bureau of Labor Standards, U. S. Department of Labor taking part.

Issue Tax Bulletin for Small Businesses

The principal types of federal, state and local taxes and tax laws which must be considered in planning or operating a small business are summarized in a bulletin issued by the NPA Office of Small Business.

The bulletin, titled *Basic Tax Information for Small Business,* is designed to assist operators and prospective operators of small manufacturing, distributive, and service firms.

It discusses federal income taxes upon business owners as individuals and upon corporations; withholding of federal income and social security taxes from employees' wages; important changes in the Social Security Act which went into effect during 1951; federal excess profits, manufacturers' excise, retailers' excise and occupational taxes, and federal license fees.

Other sections of the bulletin deal with state taxes, including property, sales and use, license, unemployment compensation and income taxes, and typical local taxes such as those on property or on businesses, professions and occupations.

Copies are available free from the Division of Printing Services, U. S. Department of Commerce, Washington 25, D. C., and from all Department of Commerce field offices.

Water Storage Begins at San Angelo Reservoir

San Angelo Dam and Reservoir project soon will take a big step toward fulfilling its intended purposes—the conservation of much-needed water and the harnessing of destructive floods which sweep down the North Concho River from time to time.

According to Col. Delbert B. Freeman, district engineer of the Fort Worth District, Corps of Engineers, which supervised the construction of this $15,150,000 project near San Angelo, Tex., storage of water in the reservoir area behind the dam was started on the 1st of February.

Initiation of storage at this time, even though some real estate located in the upper reaches of the reservoir area is yet to be acquired, was decided upon so that the dam may hold back seasonal rains to relieve the crucial water shortage in this west Texas area.

The lake area expected to be flooded consists of government-owned or gov-

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ernment-controlled land along the North Concho extending from San Angelo Dam to a point approximately five miles above the outlet works of the structure, Freeman explained.

Under present plans, initial impoundment will be limited to elevation 1,900, which will reach approximately up to the mouth of Dry Creek. At this level a lake covering approximately 3,800 acres will be created. A further rise to "normal" pool level—elevation 1,908—will be permitted later as land purchases are completed.

Actual construction of the dam began in May, 1947. It was operationally complete by the summer of 1951, and ceremonies dedicating the project were held at the dam last September. The dam is 37,540 feet — or more than seven miles — long with the reservoir, extending at normal level, over 5,440 acres.

New York Building Firm Elects Three Officers

Thompson-Starrett Co., Inc., announced the recent election of three officers. Two of the executive posts were newly created by the 52 year old building firm best known for its skyscrapers that accent the New York skyline from the Woolworth Building to the Waldorf-Astoria Hotel.

Leon P. O'Connor, who had been serving as vice president and general manager for the past year, has been elected executive vice president, a new post. He also serves as a director.

George J. Meyers has been advanced from assistant vice president to vice president in charge of budget and cost control. During the past year he has directed the reorganization of the company's fiscal methods and controls.

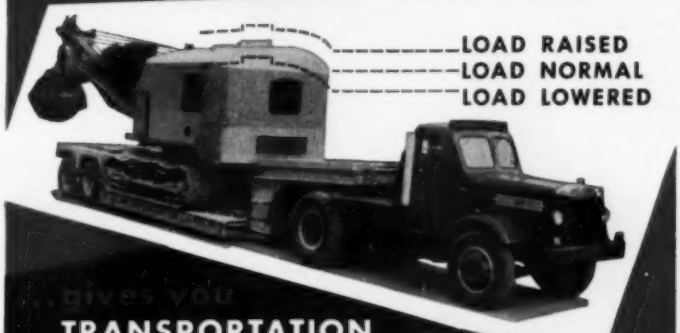
Geoffrey Breitner of Berkeley, Calif., where he headed his own public accounting firm after serving as comptroller of W. A. Bechtel Co., has been elected treasurer, succeeding James J. Boeri. Breitner joined Thompson-Starrett last September.

Ohio Fuel Gas Co. Plans Expansion

Plans of the Ohio Fuel Gas Co. for a $22 million construction and improvement program for 1952 were announced by W. N. Grinstead, company president. He also confirmed previous reports that the company would seek higher rates to offset increasing costs.

The 1952 construction program will mark the sixth consecutive year of expansion for the company, which in the past five years has spent $82 million for new facilities to deliver more natural gas.

Only ROGERS TYPE "TPG" Power Lift
DETACHABLE GOOSENECK



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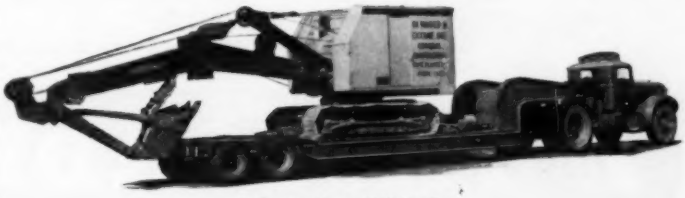
A Rogers Type "D" Trailer

BIG Tractor-shovel with BIG push

4-wheel drive PAYLOADER®

Contractors and Public Works men are happy with the big Model HM 1½ yd. "PAYLOADER" because of the combination of power, mobility and versatility it gives them — power and 4-wheel traction to get *big* production even when ground conditions are poor . . . mobility to get from job to job quickly at speeds up to 16 m.p.h. . . . versatility to dig, load, grade, bulldoze, spread, pull and push . . . to work on or off pavement.

This tractor-shovel also makes a hit with operators because it rides easy and has a big comfortable seat, power-boosted steering and fingertip hydraulic control.

Four speeds *reverse* as well as forward permit as fast operation in both directions as the job conditions allow, and there's a choice of gasoline or diesel power. Once you've seen a Model HM in action you'll understand why hundreds of owners and operators are its enthusiastic boosters.

The Frank G. Hough Co., 708 Sunnyside Ave., Libertyville, Ill.

WRITE for catalog on the 1½ yd. Model HM or the six other "PAYLOADER" sizes down to 12 cu. ft. bucket capacity.

PAYLOADER®

NOT in the *Contract*

A comely young WAC was walking alone on a dusty road when she spied a lake in a grove of beautiful trees. On an impulse she took off her clothes and had a fine swim and sun bath in the nude. Suddenly she saw an officer heading in her direction. She made a dive for her clothes and sighed relief when she got the last button closed before he entered the glade. The officer paid no attention to her, however. He walked to the edge of the lake, wheeled about, and barked "Camouflage battalion, tenshun! Forward march!" Every tree around the lake marched off.

A self styled reformer was watching a trench being dug with modern machine methods. He said to the superintendent:

"This machine has taken jobs from scores of men. Why don't you junk it and put 100 men in that ditch with shovels?"

The superintendent snorted: "Better still, why not put a thousand men in there with teaspoons?"

Baby Corn: "Mama, where did I come from?"

Mama Corn: "The stalk brought you."

Golfer: "You must be the worst caddie in the world."

Caddie: "Hardly sir. That would be too much of a coincidence."

He: "I can't see what keeps girls from freezing."

She: "You're not supposed to."

The mother of a careless little girl constantly corrected her, telling her to keep her things in better order. The advice had little effect.

One day, however, the mother came home and found the little girl frantically putting everything in place. Rather astonished, she said, "You are doing a wonderful job. What made you decide to put things in such good order?"

The little girl replied, "Why, mother! Didn't you see the story in the paper about two girls being arrested and put in jail for having a disorderly house?"

Nurse (in insane asylum): "There is a man outside who wants to know if we have lost an inmate."

Doctor: "Why?"

Nurse: "He says that some one ran off with his wife."

Doctor: "Why do you have BF9287 tattooed on your back?"

Patient: "That's not tattooed. That's where my wife ran into me when I was opening the garage doors."

Little Chris (ending prayer): And please, Lord, put the vitamins in pie and cake instead of in cod-liver oil and spinach. Amen.

Inebriate returning to bar: "Shay, I think I've been kidnaped!"

Bartender: "How come?"

Inebriate: "When I went home, I looked in my lil' bed, and I wasn't there."

An eleven-year-old violinist sent a letter to one of the juvenile participation shows. It read:

"I listen to your program every day, and my greatest ambition is to appear on it and play a violin. I have been taking lessons for three years and already have given two solos at my school. Thank you, sir. Homer G."

The heavy hand of Homer's doting mother in preparing the letter was obvious, but she apparently left the room once it was sealed in the envelope, for on the back flap in bold letters Homer had written: "Nuts to you, you big jerk!"

Smith, a confirmed Floridian, was having considerable difficulty holding his temper during a visit to California. All his friend could talk about was the superiority of California weather over that of Florida.

Finally, Smith pointed to the sky and testily inquired, "If your weather is so wonderful, what about all those clouds?"

"Oh those," nonchalantly replied his friend. "Just empties coming back from Florida!"

"It was the only way we could invite the public to the dedication."

Equipment You Ought to Know About

Truck Line

Manufacturer: Ford Motor Co., Dearborn, Mich.

Claims: Ford's new truck line for 1952 offers the widest range of engines and power combinations in company history.

The 1952 line offers five engines, including three new high-compression, low-friction overhead valve units.

F-1 through F-8 trucks range from light pickup units of 114-inch wheelbase and 4,700 pounds gross vehicle weight up to extra-heavy-duty trucks with a maximum 195-inch wheelbase and gross combination weight ratings up to 41,000 pounds.

Besides the three all-new engines, the horsepower and torque of the 239 cubic-inch V-8 and the Big Six engines have been increased to complete a five-engine power package for the eight basic truck series. The 239 V-8's horsepower was raised to 106 and its torque was increased to 194 pounds feet. The Big Six's new rating is 112 horsepower and torque of 217 pounds feet. All engines are designed to operate on regular gasolines. The three new low-friction truck engines are the Cost Clipper Six, a 101-hp unit, and the new Cargo King 145-hp and 155-hp V-8's.

Plant construction and tooling for the engines were well advanced before the Korean crisis developed and before materials and tool and die facilities were needed for defense work.

All regular truck units are available with 5-Star cabs or with 5-Star Extra cabs which feature such extras as foam rubber seat padding, insulated headlining, key locks on both doors, cigar lighter, dome light with automatic door switches, arm rests and interior insulation.

All Ford truck engines feature the Power Pilot carburetion-ignition system, aluminum autothermic expansion control pistons, full-pressure lubrication, free-turn valves and precision-molded improved alloy crankshafts, camshafts and exhaust valves.

The new overhead valve engines have integral valve guides, full-flow oil filters, deep crankcase structure for engine rigidity, and a short piston stroke which results in a marked reduction of internal friction and increase in usable horsepower.

A PAYLOAD . . . Every Cast!
Omaha Dragline Buckets dig in faster, fill quicker, and dump cleaner because 40 years experience in building buckets have made them the tops in the field. Available in four types. Write today for catalog giving complete description and specifications.
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DRAGLINE BUCKETS
DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

Starting Fluid Capsules

Manufacturer: The California Oil Co., New York 1, N. Y.

Claims: Chevron starting fluid has given fast starts to motored equipment owners in temperatures ranging from 40° F. above zero to 50 below.

Inserted into a holder installed on or near the dash board, the capsule is pierced by a puncturing tool, and its

fluid released and injected into the intake air manifold system through an engine primer. The priming system was also developed and is distributed by the company.

Heavy equipment owners and operators were asked for information on performance of the capsules. Butler Sand Service, Portland, Conn., operating shovels and bulldozers, wrote, "Until we used the capsules, we wasted many valuable hours trying to start our equipment with battery boosters and blow torches in cold weather."

In replying that he saves as much as $2,000 in lost time, and wear and tear, a coal stripping operator at Carbondale, Pa., says, "Capsules work very satisfactory for us."

Two sizes of gelatin capsules are provided—containing 7 cc and 17 cc of starting fluid respectively. The capsule sizes have been designed to provide the correct quantity of fluid which experience has shown is required to start most engines. The capsules are used with a special puncturing tool and priming system permanently connected to the intake manifold system of the engine. One or more capsules are placed in the puncturing tool where they are punctured by the simple act of pressing down a plunger. The fluid in a predetermined amount, is then released to the primer pump for priming into the engine by the operator. The priming system has been designed with one to three injection nozzles so that it is adaptable to all internal combustion engine types and sizes.

Quarry Shovel

Manufacturer: Marion Power Shovel Co., Marion, Ohio.

Claims: The new Marion 191-M has the following performance features: a 10-yd. heavy duty shovel with small-machine cycle time, loads trucks of the 50 ton class in three or four passes, electric or diesel electric power, Ward-Leonard control, "Amplidyne" or "Rototrol" application of electric power

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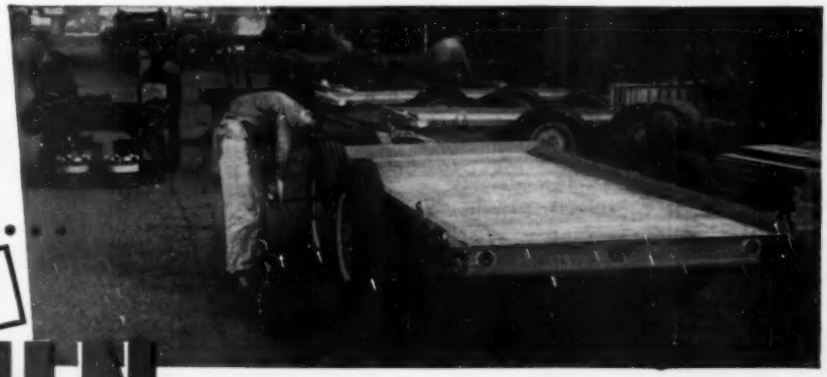
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NEW
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ready for spring shipment!
To better serve our customers we have increased facilities to meet the constant demand for Jahn Trailers. Additional production equipment and the latest techniques enable us to supply the engineering and construction industry with rugged, dependable, modern trailers for delivery this Spring. Fill in the coupon for literature on the popular models now in production.
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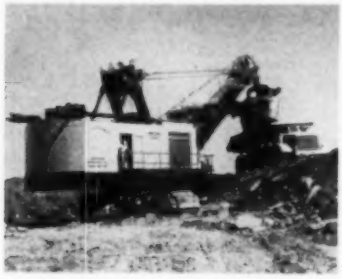
and production potential of over half a million yards per month.

Most interest in the new machine is expected to come from industries such as mining, quarrying, heavy construction and coal. As a close-coupled shovel, the 191-M is in the category of heavy-duty machines with boom and handle lengths relatively short in pro-



portion to the weight and power of the machine. Close-coupled machines are predominantly found in mining and slag pits where heavy, hard materials are regularly encountered and in construction projects where all kinds of digging conditions including shale and rock are to be handled.

The lower frame of the 191-M is formed of heavy steel plate welded into a deep bulkhead structure. The crawler side frames are attached to the frame structure by means of bolts and heavy key-type doweled joints. The propel mechanism is fully enclosed and is hydraulically controlled to eliminate the need for electrical assemblies in the lower frame. Crawler shoes are of manganese steel, and the crawler belts are driven by dirt-shedding sprockets. Dual propel brakes are fitted with brake linings having a high friction coefficient. The brakes are operated hydraulically and controlled electrically by the operator.

The upper frame is a deep, welded structure with machinery supports welded integral with the frame. Two matching 187½ hp 600 line motors, with blowers, operate the hoist machinery and, through the use of clutches, drive the propel mechanism. Twin swing motors of 62½ hp are also equipped with blowers. Another 62½ hp motor mounted on the boom provides power for crowding and crowd retract. Air-operated ram cylinders, electrically controlled, are used on the upper frame and crowd machinery.

The 191-M has a working weight of approximately 710,000 lbs.

Rock Bit

Manufacturer: Rock Bit Sales & Service Co., Philadelphia 25, Pa.

Claims: For drilling long holes varying in depth from 20 to 150 feet, a complete set of tools is offered for use with the standard percussion type rock drills. These tools include: Tru-Seal shank, adapters, couplings, extension rod, Rok-Bit tungsten carbide bits. They are for use in drilling grout holes, test holes, sub-level bench stopping holes or blast holes of standard diameters—1⅞ inch and 3 inch. Such holes can be drilled in any type of rock or ore and in any direction by following a recommended procedure. Based on over a year's successful field operation, the couplings and adapters are designed to be self-cooling—self cleaning. The tool's design keeps the hole in alignment and eliminates excessive vibration at maximum depth. They also point out that where user has his own steel shop, the sectional steel can be made on the job.

Payloader

Manufacturer: Frank G. Hough Co., 708 Seventh St., Libertyville, Ill.

Claims: This four-wheel drive "Payloader" tractor-shovel has a one yard bucket with 60 hp Diesel or 54 hp gasoline power optional. This Model HR is similar to the big 1½-yd. Model HM. The use of large pneumatic tires, same size all around, and drive on all four wheels gives this new machine the traction and flotation to work effectively in sand, mud and snow and travel on pavements without injuring the surface. Rear wheel steer with power booster plus short wheel base makes it maneuverable and easy to operate. Four speeds in both directions insure fast travel speeds for transport and fast operating speeds on shuttle loading or similar operations. Finger-tip-controlled hydraulic power raises-and-lowers and dumps-and-closes the bucket.

A powerful automatic digging action independent of the forward motion is another characteristic. Automatic quick tip back of the bucket is also provided so that heaped bucket loads can be retained without spilling and can be

ERIE BUCKET CATALOG *Shows*

Gross Loads for 43 Standard 2-Line Buckets in 9 Materials

Write for a copy of Catalog 2L-2. Compare your present bucket performance to see if you are getting the most from your crane. Or send us size and make of crane and materials handled, giving present bucket output. We'll give you Erie's proved bucket performance for your crane.

Erie makes 4 standard types of 2-line buckets in 43 sizes.

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carried low for good machine balance and full operator visibility. Because the seat is located high and forward, the operator has good visibility. The twin hydraulic boom rams are double acting, also the ram that dumps and closes the bucket. Thus down-pressure can be applied to the bucket to dig into hard formations with positive control of bucket action at all times.

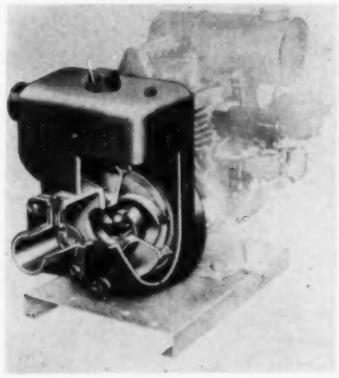
Bulldozer blade, crane hook, fork lift, and snow plow attachments are available, quickly interchangeable with the bucket to increase its usefulness.

Pump Line

Manufacturer: Marlow Pumps, Ridgewood, N. J.

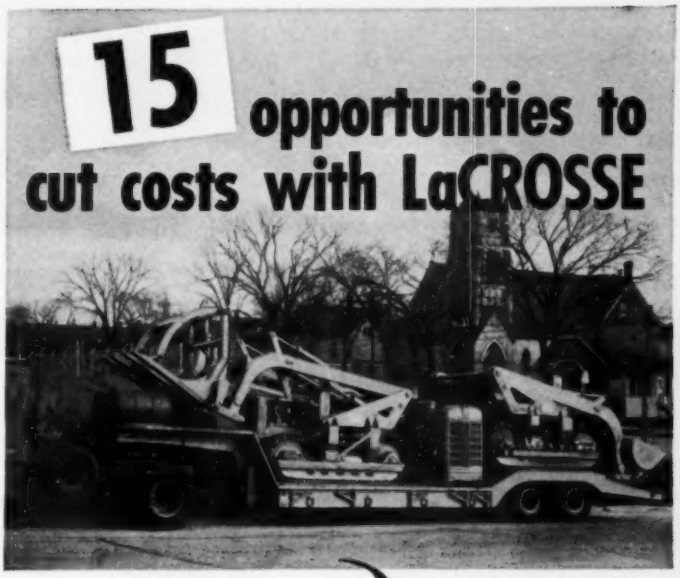
Claims: The new pumps, self-priming centrifugals, have been entirely redesigned and bear no outside resemblance to former models.

Construction is much simpler than previous models. The pump is made up of a check valve assembly, a tank, a diffuser, an impeller, and a shaft seal. The check valve is conveniently mounted on the outside of the pump. It forms an accessible porthole reaching directly to the pump impeller. The tank is cast in one piece and may be removed by loosening only one circle of bolts. This exposes the working interior parts of the pump. The diffuser is held in place by the tank and can be lifted off



the impeller when the tank is removed. It is only necessary to loosen one cap nut to remove the impeller. These five simple assemblies form the basic structure of the pump. Assembly and disassembly is exceptionally easy. Only

15 opportunities to cut costs with LaCROSSE



If you operate any of the 15 types of equipment listed at right, you'll be time and money ahead with a dependable La Crosse trailer. Saves up to 4 hrs. waiting time for a rental unit on every move . . . permits better scheduling of work . . . keeps major equipment and crews busy for higher earnings. There's a job-proved La Crosse trailer for every hauling need—6 to 67 tons capacity . . . single, dual or tandem axle . . . flat, drop or tilting platform. Write today for free literature, prices and delivery information. LC-23

- ☐ Asphalt Finishers
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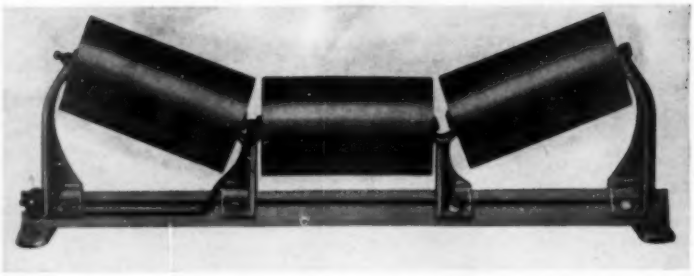
America's Favorite LOW BED TRAILER

two parts, the impeller and diffuser, can wear and reduce the efficiency of the pump. Both are easily replaced, restoring original factory efficiency.

The new pumps can be quickly put into operation. Both suction and discharge connections are male threaded and hose connections are made directly to the pump. It is not necessary for the user to furnish extra fittings. When the hose is connected, the pump tank is filled with water through a large opening in the top of the tank. Once the pump tank is filled, priming and repriming operations are entirely automatic.

Laboratory tests and field tests, by the manufacturer, have demonstrated that the new pumps are more efficient than previous models. New impeller designs have improved performance so that full A. G. C. ratings are met at moderate engine speeds. The low suction inlet places the connection closer to the water thus reducing the suction lift. The friction factor is also lower since water entering the inlet is fed straight to the impeller. Passageways through the impeller and diffuser have been designed with larger clearances for improved trash handling ability. Priming is faster due to the multiple point air stripping action of the Marlow developed diffuser. Suction lifts of 25 feet are guaranteed by the manufacturer.

Contractors pumps are available with capacities up to 240,000 gph. This includes all A. G. C. sizes plus several other sizes not rated by the Associated General Contractors. Special high pressure models for water supply and jetting are also available. Pumps can be changed from base mounted units to steel wheel or pneumatic tire mounted units without changing the base. Models equipped for burning kerosene or powered by Diesel engines are available as stock items.



Belt Conveyor Improvement

Manufacturer: Chain Belt Co., Milwaukee 4, Wis.

Claims: This is the first basic improvement in years in belt conveyor idlers greasing design. Rigid steel grease piping has been replaced by reinforced flexible automotive type grease tubing, which will take higher gun pressures, and will not break off in shipment.

The flexible sections are made in lengths which allow them to "hug" the inside of the inverted angle or channel base. Grease tube extension to the far side is accomplished by threading a flexible section through the base to the grease fitting at the near side.

New, also, is the location of the grease fittings. They are more accessible, permitting safe servicing at any time . . . and are protected during shipment by the idler base. The new design eliminates the headache of broken grease lines. The picture illustrates the simplicity of the new design — now standard on Rex roller bearing belt conveyor idlers.

Tilt Trailer

Manufacturer: La Crosse Trailer Corp., La Crosse, Wis.

Claims: This new heavy-duty gooseneck-type trailer with tilting platform, for transporting heavy machinery with standard fifth wheel tractors, has just been announced. The trailer is easily loaded or unloaded in 5 minutes by one man, without skids or blocking.

Available in 14, 18 and 22 ton capacity, the new Model GTTA trailer is of tandem axle design, with 96 inch width platform, which tilts into loading position by releasing simple lock at front of platform. Two double-acting hydraulic cylinders "cushion" load during tilting. After load is driven or winched into place, platform locks automatically in horizontal position for hauling.

Trailer is constructed with one-piece formed gooseneck and subframe, and is

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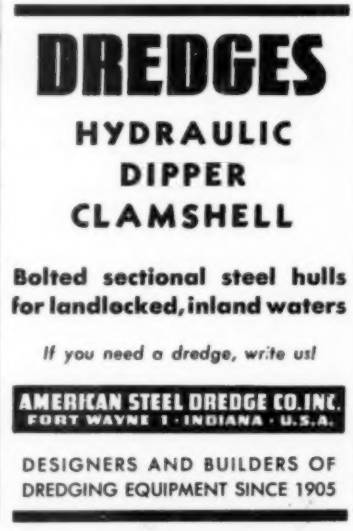
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equipped with "walking beams" supporting the axles, to provide maximum oscillation for equal load distribution over any type road surface. Constant rise S cam brakes operated by worm gear slack adjusters assure perfect braking contact at all times.

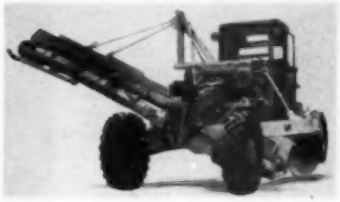
Trailer carries eight 15 inch tires with extra wide base rims, and is available with either air or vacuum brakes. Three lash hooks on each side are included as standard equipment, with the usual lights, reflectors, stake pockets and other accessories available at extra cost.

Grader Attachment

Manufacturer: Williams & Reisser Co., P. O. Box 1126, Omaha 1, Nebr.

Claims: A new elevating grader attachment, with a hinged carrier to facilitate movement from job to job, has been given the trade name of "Elegrader." It is designed to work on Adams Models 550 and 610 motor graders.

The exclusive hinged carrier design rules out troublesome dismantling to allow highway travel. Clearance is no problem for oncoming traffic, narrow gates and underpasses, narrow bridges or loading onto other vehicles for long hauls. The Elegrader has been carefully designed to permit maximum visibility for the operator both in normal operating position or with the carrier raised to traveling position. Less than fifteen minutes is required to raise



the hinged carrier to traveling position. When this has been done, the Elegrader has the same center of gravity as the motor grader alone.

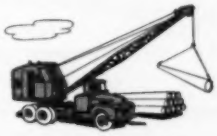
The carrier is equipped with a 36 inch trough type belt which is an innovation in elevating grader design and has equal capacity to a 48 inch conventional flat type belt. All troughing rollers are mounted on self-lubricated, permanently sealed ball bearings which do not require servicing. All other moving parts are mounted on either ball or roller bearings.

Another major feature is ease of mounting the attachment to the motor grader. No welding, cutting or major alterations to the motor grader are necessary. Precision made interlocking steel wedge plates reinforce the hinge on the carrier, assuring a rigid, solid stiffness in either working or traveling position.

- ☐ Loading sand, gravel
- ☐ Erecting steel
- ☐ Pouring concrete
- ☐ Handling pipe, timbers
- ☐ Digging foundations and footings
- ☐ Driving piling
- ☐ Trenching for pipelines
- ☐ Stockpiling materials
- ☐ Digging and cleaning ditches
- ☐ Excavating small pits
- ☐ Building access roads
- ☐ Removing overburden
- ☐ Repairing slides, washouts
- ☐ Feeding portable crushing plants
- ☐ Misc. clearing and grading

Why go to the expense of moving in big equipment, or special work crews, when hundreds of jobs like those listed at the right can now be handled faster, more economically with a job-proved Bantam. *Costs only a fraction of the price of bigger machines* . . . mounts on new or used truck for high-speed mobility . . . has 8 fast-change attachments, with big work capacity, for profitable year 'round operation. Ideal for scattered assignments or crowded locations, where bigger, heavier machines can't go. Write for literature. Schield Bantam Co., 202 Park St., Waverly, Iowa, U. S. A.

SB-DB-3C



Bantam crane lifts 5 tons, handles ½ cu. yd. concrete bucket, 1400 to 2400# pile driver. Booms up to 50'.

Back hoe digs 100' of 5' trench per hr. Depths to 14'. Fast-change adaptors for hoisting and backfilling.

Shovel or dragline loads up to 90 cu. yds. of material per hr. Drives anywhere... goes right to work.

SCHIELD BANTAM

Cranes • Excavators

Get more jobs done at less cost

New trade literature

Subject: **Hardfacing Wall Chart**
Content: A new wall chart which details the proper hardfacing rod for the job has just been released. The chart divides welding into basic operations, under which are listed the equipment parts to be Amscoated together with the recommended rod, available sizes, and preferred method of application. A fuller description of the uses of each rod also appears on the chart. The chart is 17 inches by 26 inches with tabs attached for easy hanging and has a lacquered surface to keep it readable under shop conditions.
Where to get: American Manganese Steel Div., Chicago Heights, Ill.

Subject: **Engine Maintenance**
Content: "Hey! What stopped that engine?" cries the job foreman. That's the start of a cartoon story presented in "Small Engine Maintenance Guide," a 28-page, four-color service booklet. In the booklet a dealer's serviceman shows how ". . . good maintenance will add many hours of top performance to your engines." Maintenance facts apply to the six smaller sizes of Diesel engines, marine engines and electric sets. The booklet is first of a series dedicated to proper equipment maintenance. Full discussion is given to cooling, lubricating, air intake and exhaust and fuel supply systems. Also included are care of starting engines, marine gear and generators, along with cold weather hints and general facts.
Where to get: Caterpillar Tractor Co., Peoria, Ill. (Form 30246)

Subject: **Crane Versatility**
Content: *Busy As A Bee* is the apt title of a recent publication by Bucyrus-Erie Co. describing the all-hydraulic Hydrocrane. The two-color, 24-page booklet pictorially illustrates the machine's versatility by showing it doing everything from digging ditches to moving furniture through second story windows. The more than 100 illustrations show the machine with its many attachments placing tanks and pipe; digging, trenching and backfilling; hoisting and erecting; loading, unloading and stockpiling; and cleaning catch basins, removing snow and stumps and cleaning up in quarries, mines and public streets. The truck-mounted machine is extremely mobile—capable of highway speeds up to 50 mph. With a crane front-end, such attachments as magnet, ⅜ yd. clamshell, ½ yd. trash bucket, orange peel catch basin bucket, 3-tine grapple, or forked grab can be put into service in a matter of minutes. The crane front-end is quickly convertible, in the field, to the dragshovel called Hydrahoe.
Where to get: Bucyrus-Erie Co., South Milwaukee, Wis.

Subject: **Heat Machines**
Content: A 6-page bulletin describing a new line of heat machines is printed in two colors and illustrated with photographs and line sketches. The bulletin explains the Fageol heat machine principle of spraying heated air out at floor level to form a blanket of warm air in the working area where it's needed, instead of overhead where it's wasted. Two models, the PW-140 (140,000 BTU unvented portable) and the VO-160 (160,000 BTU with vent optional) are illustrated in the bulletin and

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AND THIMBLE
SIZES TO FIT WIRE ROPES FROM ¼" TO ⅞" IN DIAMETER
DEVELOPS 85 TO 90% OF ULTIMATE ROPE STRENGTH (95-100% CATALOG LIST)
NEWCO
THE HEAVIER THE LOAD THE TIGHTER IT HOLDS!
PAT. PEND.
The most efficient attachment for wire rope because of combined strength and design. Permanent castings, standard replaceable bolts and nuts. NO WRONG SIDE—threads either way. Easy to install in field or shop, and never needs lubricating.
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DEPT. E3 BOX 5905 KANSAS CITY 2, MO.

dimensions and specifications are listed. A few of the many applications for the portable, oil-burning heat machines are shown in line sketches in bulletin L-4782. These applications range from office and factory use to heating construction machinery, drying concrete, and heating warehouses.

Where to get: Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich.

Subject: **Cost Comparator**

Content: Fuel savings of Diesels over gasoline engines can be easily calculated in dollars on this new cost comparator. This handy slide-rule type calculator will allow the power user to quickly determine the yearly savings that can be realized through the use of Diesels for all types of applications. The cost comparator is based on fuel savings experienced by operators during the past 33 years. For the truck owners, one scale is on a mileage basis. Diesel fuel—gasoline price differential, as well as the increased miles per gallon gained by Diesels are considered. The reverse side of the slide-rule shows savings on an hourly basis for industrial and marine power users.

Where to get: Cummins Engine Co., Inc., Columbus, Ind.

Subject: **Conveyor and Elevator Belting**

Content: A new catalog on conveyor and elevator belting gives all the necessary data to lay out a drive or specify a belt. Complete tables on carrying capacities, horsepower factors, pulley diameters, maximum and minimum plies for proper troughing, and other engineering information are included.

Where to get: Frank E. Tilley, New York Belting and Packing Co., 1230 Avenue of the Americas, New York 20, N. Y.

Subject: **Volcanic Ash and Laterite Soils in Highway Construction**

Content: Bulletin 44 contains a paper by K. B. Hirashima, testing engineer for the Territorial Highway Department, Hawaii, on "Highway Construction Problems Involving Plastic Volcanic Ash" and a paper by Hans F. Winterkorn and E. C. Chandrasekharan, of the Winterkorn Road Research Institute, Princeton, N. J., entitled "Laterite Soils and Their Stabilization." In the first paper, Hirashima discusses the peculiarities of certain highly plastic soils derived by the weathering of volcanic ash under conditions of continuous moisture along the eastern shores of the Island of Hawaii. The soils have a natural moisture content of about 200%. The author discusses special methods which have been developed to facilitate construction with these soils. In particular, provision for a layer of rocky material to provide positive traction for construction equipment during grading operations has proven beneficial. The Winterkorn-Chandrasekharan paper discusses the origin, occurrence, and correct identification of laterite rock and soil. The peculiar properties of laterite soils are outlined and suggested methods of dealing with them are indicated. Results are reported of experimental studies with special attention to stabilization. Portland cement gave best results in some cases and anilinefurfural in others. The paper includes a map of the distribution of laterite and lateritic soils in the world and a number of tables of characteristics.

Where to get: Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C. (60c)

Subject: **Electrical Wires and Cables**

Content: A new 52-page engineering catalog on a line of electrical wires

HERE'S HOW IT WORKS:

POSITIVE —AUTOMATIC

YOU DON'T HAVE TO

KICK THE BUCKET

TO CLEAR IT—IF IT'S A

PEKAY

M-T-MATIC

Irresistible leverage sweeps out SAND —COAL—GRAVEL, or any granular materials, on every trip—*even if frozen or close-packed.* The secret is the separately mounted stripper-plate—which *must* push up and out when it starts over pulley radius. THOUSANDS NOW IN USE —handling *more* material at same or faster belt speeds. Saves belts—cuts maintenance—easy to install on any elevator conveyor—all sizes.

QUICK DELIVERY!

standard buckets also available..

★ SEND FOR PRICES TODAY (give present bucket size)

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100 N. LA SALLE STREET CHICAGO 2, ILLINOIS

and cables for the coal mining industry has just been published. The booklet includes complete performance and specification data on insulation and jacket compounds, portable cords and cables with a voltage rating up to 5,000 volts. Also included are complete data on shielded portable cables, welding cables, bore hole cables, mine power cables and miscellaneous mine equipment such as blasting wires and mine telephone cable. Engineering data on splicing and patching, current carrying capacities, conductor resistance temperature correction factors and formulae for determining amperes are also incorporated in the booklet.

Where to get: R. H. Turner, Electrical Wire and Cable Dept., United States Rubber Co., Rockefeller Center, New York 20, N. Y.

Subject: **Diesel Engine Uses**

Content: How the production of 50 million Diesel horsepower by a single manufacturer can be regarded as an owner's insurance policy to assure top engine performance is told in a booklet just published. The booklet covers various design features of the GM 2-cycle Diesel engine, action photographs of installations in the construction, mining, oil well drilling, and industrial fields and a map showing the division's widespread sales and service facilities throughout the country.

Where to get: Detroit Diesel Engine Div., 13400 W. Outer Drive, Detroit 28, Mich.

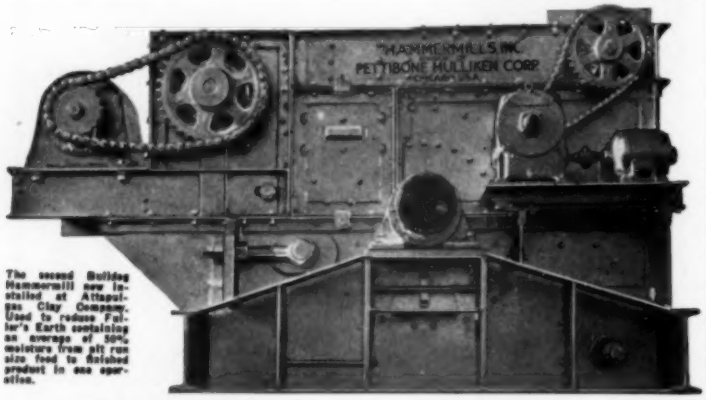
Subject: **High-temperature "Drilling"**

Content: Within the last several years, jet-piercing, a process created and developed by Linde Air Products Co. has received prominent attention in mining and quarrying circles as a revolutionary aid to more rapid surface mining. This process employs a supersonic high-temperature flame as the "drilling" medium. It promises to become increasingly important wherever hard, abrasive rock must be prepared for blasting. Detailed information on the fundamentals and practice of the jet-piercing process has now been made available in booklet, "Jet-Piercing, Key to Taconite Development." This first complete compilation of information on the process deals with the design and operation of automatic jet-piercing machines as well as hand-operated jet-piercing blowpipes. Actual piercing results are given, and new developments toward increasing overall process efficiency, are presented and discussed.

Where to get: Linde Air Products Co., a Division of Union Carbide and Carbon Corp., 30 E. 42nd St., NYC.

Subject: **Accident Prevention**

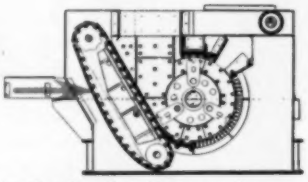
Content: The American Standard Manual of Accident Prevention in Construction presents, by illustrations, specifications, and simplified text, the safe way of performing construction work and emphasizes the costly results of incorrect, unsafe practices. The manual contains 43 chapters dealing with such subjects as sanitation, first aid, building demolition, electric welding, handling and storage of materials, ex-



The second Bulldog Hammermill now installed at Attapulgus Clay Company. Used to reduce Fuller's Earth containing an average of 30% moisture from pit run size feed to finished product in one operation.

Bulldog Hammermill

with Moving Breaker Plate



For wet, sticky material reduction . . . for those tough, heavy-duty crushing jobs.

Illustrated above is the last word in Moving Breaker Plate Hammermill design. It is built by an engineering organization whose experience far surpasses any organization that might furnish Moving Breaker Plate crushing equipment.

Design Improvements have increased reduction efficiencies and lowered H.P. requirements. You can see this equipment in operation at any time. Also Hammermills will gladly survey your reduction requirements and recommend the proper equipment without cost or obligation. Just write or call.

Bulldog Hammermills are built in capacities up to 1000 tons per hour for every purpose: for primary, secondary, fine reduction of materials such as limestone, shale, Fuller's Earth, phosphate muck, phosphate mud balls, iron ore, oyster or clam shells, any reducible material.

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cavation, explosives, pile driving, scaffolding, power saws, shafts, boilers, temporary electrical installations, fire hazards and prevention, occupational diseases, etc. The Associated General Contractors of America developed the first edition of this manual 25 years ago, and they have revised it periodically to make sure that it reflects the latest industrial practices. All editions since 1938 have been submitted to ASA for approval as an American Standard. Approval as an American Standard certifies that a consensus of all parties-at-interest has been reached on the provisions of the standard.

Where to get: American Standard Association, 70 E. 45 St., New York 17, N. Y. (A10.1-1951)

Title: **Electrode-Selector Chart**

Subject: This new bulletin is designed to present up-to-date condensed information on recommended electrodes for the welding of mild steel, stainless steel, low hydrogen-low alloy steels, low alloy-high tensile steels, cast-iron, bronze and other metals.

Where to get: General Electric Co., Schenectady 5, N. Y. (Free)

Subject: **Diesel Engines**

Content: Design and operation features of the Nordberg one, two and recently introduced three cylinder Type 4FS Diesel engines are illustrated and described in a new 12-page, two-color bulletin. Built for continuous duty or standby service, the 4FS Diesel engines described in Bulletin 194 have a 4½ inch bore and 5¼ inch stroke and are of the four-cycle, vertical mechanical injection type. The units range from 10 to 45 hp within an operating speed range of 1,200 to 1,800 rpm. Bulletin 194 illustrates with installation photographs typical applications of 4FS Diesel engines and show through a cross section view the construction features. Also contained are pictures showing all main engine parts and complete engine specifications.

Where to get: Nordberg Manufacturing Co., Milwaukee 1, Wis.

Subject: **Coal Mine Maintenance Welding**

Content: The first in a new series of "How To Weld It Better" manuals, titled *Coal Mine Maintenance Welding* has just been issued. This new, profusely illustrated book covers in detail the various specialized welding applications found in the field of coal mine maintenance welding. This includes such problem-cases as heavy cast iron repairs, dragline shovel pinion repair, pump and compressor repairs and similar specific recommendations, together with case histories based on actual in-the-field welding operations. Included in the manual is a standardization chart.

Where to get: Eutectic Welding Alloys Corp., Dept. "P," 172nd St. and Northern Blvd., Flushing-New York 58, N. Y.

"He's going to make sure we don't run off with any of this dirt—it's worth $15,000 an acre."

MOVE MORE YARDAGE... at less cost..

Above is an example of how a Sauerman rapid-shifting scraper digs wide and deep in hard-packed gravel bed — averages 42 loads moved hourly to screening plant.

with a one-man

Sauerman Machine

Power and labor are saved in excavating gravel, cleaning ponds, stripping overburden, stockpiling, and similar material handling work, by the Sauerman method which combines digging, hauling and dumping of material in a continuous, rapid process controlled by one operator. Daily yardage goes up, while expense goes down.

For hauls up to 1,000 ft. in dry pits or banks or for stockpiling any kind of bulk material — use a Sauerman Power Drag Scraper. For digging from a wet pit, river or lake — use a Sauerman Slackline Cableway. Rapid and dependable results at minimum cost. As little as 2c a cubic yard covers operating charges.

Specifications, operating data, capacity charts, photos of typical installations of varied types and sizes — all are in the Sauerman Catalog. Write for this free book today.

This picture shows how a small Sauerman scraper handles seasonal storage of 30,000 tons of surplus output at crushing plant, piling the surplus material in a single long pile and later reclaiming to a car-loading hopper.

Here is a 2½ cu. yd. Sauerman slackline cableway moving gravel out of a deep pit 400' wide by 900' long which it excavated during the last two seasons while producing about 300,000 cu. yd. a season.

SAUERMAN BROS., Inc.

574 S. Clinton St., Chicago 7, Illinois

Cableway and Scraper Specialists Since 1909

Notes from the manufacturers

Air Reduction Magnolia Co., Division of Air Reduction Co., Inc., has appointed John Lund district manager. With headquarters at Shreveport, La., Lund will have sales responsibility for the Shreveport district, assuming the responsibilities of Heber T. Wadley, deceased. Formerly Lund was assistant manager at Shreveport and is thoroughly familiar with the operations in the Louisiana, Arkansas and east Texas territories. John Lund joined Air Reduction in the technical sales department in February of 1927 and has had sales and service experience in the Detroit, Bettendorf, Oklahoma City and Shreveport areas since that time.

Aeroquip Corp., Jackson, Mich., manufacturer of flexible hose lines and self-sealing couplings, has terminated arrangements with its south-southwest United States distributor, Aeroquip Sales and Engineering, Inc., Fort Worth, Tex. Now customers throughout the territory covering 14 states will be contacted directly by specially trained sales engineers operating from Aeroquip Corp. and its wholly owned subsidiary, Aero-Coupling Corp., Burbank, Calif. This shift in the distribution system was brought about by changing economic conditions and the current rearmament program. The first unit of personnel in the area will include Edison D. Heins, district manager industrial sales, James Tilford, sales engineer, Dallas and Houston, Tex.; Jack Harlow, sales engineer, Birmingham, Ala.; and John McCarthy and Victor Emery, sales engineers, Kansas City and St. Louis, Mo. Byron E. Snow has been appointed manager of the company's new Chicago office, 1033 S. Boulevard, Oak Park, Ill. Snow has been affiliated with the company in one capacity or another since 1943. For the past two years, he has acted as sales engineer in the Chicago area. The Chicago office will be headquarters for northern Illinois, southern Wisconsin and Iowa.

A. Leschen & Sons Rope Co., St. Louis, Mo. has transferred L. J. (Jack) Clarke, formerly New Orleans manager covering the gulf states of Louisiana, east Texas and lower Mississippi, to the New York office as district manager. "Jack," a graduate of Roanoke College, has a long and varied background in construction supervisory fields.

Allegheny Ludlum Steel Corp., Pittsburgh 22, Pa. has changed the name of its sintered carbide production and sales units from carbide alloys division to Carmet division. Carmet is the trade name under which products of the division are marketed. Carmet division is a principal producer of tungsten and other sintered carbide alloys, having pioneered their use in laminations and other dies for tips for such applications as mining bits. The division has been located at Ferndale, Mich., on the outskirts of Detroit, since it was acquired by the company in October, 1943. P. E. Floyd will continue as manager of the division and E. C. Lauck will continue to serve as production manager.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has purchased twelve acres of land located at Knowland Road and 35th Street, Independence, Mo. The company reports plans for immediate construction of a new and modern factory branch to serve agricultural and industrial dealers in eastern Kansas and western Missouri. The facilities will replace the Kansas City branch which has been located at 1224 West 12th St. since 1931. Serving more than 125 industrial and agricultural dealers, the new branch will be a modern one-story building. It will be complete with conveyor systems, loading platforms, and railroad docks. The spacious building and vast storage area is expected to handle a large inventory of harvesting equipment, wheel and crawler tractors, implements, motor graders, power units, and a complete stock of repair parts and accessories.

Barber-Greene Co., Aurora, Ill., has appointed two assistant sales managers, Harold W. Newton and William C. Gifford. Each will supervise a division of the sales organization and will assist E. H. Holt, whose appointment as general sales manager has recently been announced. Newton, who will be assistant sales manager of the conveyor division, has a wealth of experience and background in conveyor engineering. After graduation from the University of Cincinnati as a mechanical engineer he embarked on a career in con-

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SPEED-LAY PIPE SYSTEM
EVERYTHING for a COMPLETE PORTABLE PIPE SYSTEM
FACTORY PACKAGED • PIPE
COUPLINGS • FITTINGS • VALVES
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DELIVERED READY FOR INSTALLATION

Immediate Installation
by one unskilled man. 2½ to 12½ o.d. black or galvanized. Larger sizes can be furnished. Ready to lay—without delay.

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ALBERT PIPE SUPPLY CO., INC.
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Please send free booklet describing your Speed-Lay Pipe System and services:
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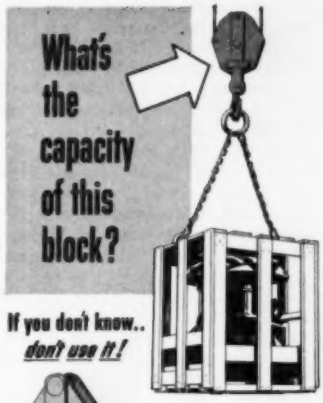
"Er . . . I don't believe that's a standard hardness test, Jones."

veyor design and engineering. After thirteen years of work in this field, he came to Barber-Greene Co. in 1936 as a sales engineer, specializing in the application of the B-G line of standardized belt conveyors and accessories. In 1942 he was appointed manager of engineered sales. In this capacity he devoted his efforts to promotion of the line in underground mining and on extensive earth moving and aggregate handling applications. William C. Gifford, who will function as assistant sales manager, machine sales, brings to his new post, more than fifteen years of service in the B-G sales organization. A graduate of the University of Illinois, Gifford served with the merchandising section of Sears-Roebuck for several years before joining the company in 1936. In the ensuing period, he has served as a market research analyst, as an expert in the company's bituminous paving line and since 1950, as sales office manager.

Broderick & Bascom Rope Co., St. Louis 15, Mo., announce that the regular annual meeting of the shareholders held in St. Louis recently elected David Larkin, former executive vice president of the company, to the board of directors. At the meeting of the new board for the election of officers, A. A. Grosse, who has been assistant treasurer, was elected to the additional office of secretary, a position formerly held by Joseph H. Bascom, now executive vice president and treasurer. Grosse's connection with the organization dates back to 1925.

Caterpillar Tractor Co., Peoria 8, Ill., has named Robert J. Loskill manager of the sales training division. Thomas A. Glass succeeds him as assistant manager of the governmental division, a position which Loskill held for the past three years. Loskill joined the company in 1936 and has served in treasury, purchasing and sales departments. His background includes experience as a district representative in the central sales division. During the years 1945-47 he attended Bradley university in Peoria, Ill., where he studied accounting and business administration. Glass served 16 years in the U. S. Army, receiving training at West Point and at command and general staff schools. He attained the rank of colonel and returned to civilian life as a Caterpillar earthmoving representative in the sales development division. His most recent assignment has been



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FAST BUCKET OPENING SPEEDS OPERATIONS

• Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

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CLAMSHELL • DRAGLINE
CUSTOM-BUILT BUCKETS
STONE AND WOOD GRABS

THE WELLMAN ENGINEERING COMPANY
7000 Central Avenue
Cleveland 4, Ohio

with the governmental division. The company also discloses that the Trackson Co. of Milwaukee, a producer of tractor-mounted machines, has become a wholly owned subsidiary. Louis B. Neumiller, president of Caterpillar, announced the issuance of 54,000 shares of Caterpillar common stock in exchange for all of the capital stock of Trackson. Neumiller will be chairman of a reconstituted Trackson board of directors which will include Walter H. Stiemke, Trackson president, and the following Caterpillar officials: William Blackie, Ralph M. Monk and J. R. Munro. Stiemke and L. E. Dauer, Trackson vice president, will continue in their present administrative capacities. Henry Gotfredson, secretary and treasurer of Trackson, plans to retire and will be succeeded by George L. Scripps, who will relinquish his office as assistant treasurer of Caterpillar. Trackson's two Milwaukee plants occupy approximately 150,000 sq. ft. of manufacturing and office space. The plants employ approximately 440 people. Trackson products have been sold through Caterpillar dealers for the past 15 years.

Cummins Engine Co., Inc., Columbus, Ind., has disclosed that Raymond H. Snyder, former president and treasurer, Snyder Aircraft Division, Air Associates, Chicago, has purchased certain assets of the Chicago operation of Cummins Diesel Sales Corp. Snyder will operate the Chicago facilities as an independently owned dealership. Headquarters will remain at 1700 S. Indiana Ave., Chicago. The territory assigned the new company includes the 22 counties of northern Illinois; Scott County, Iowa; and Lake, Porter and La Porte counties in Indiana. Snyder joins the dealership organization after more than two decades experience in the aircraft engine and supply industry. The operations at Milwaukee, Wis. and Peoria, Ill., formerly with headquarters at the Chicago dealership, now will operate as individual dealerships.

Detroit Automotive Products Corp., Detroit 13, Mich. has promoted I. M. Hagglund to manager —sales department and G. W. Pollard to service manager. Hagglund has been associated with the company in various sales and service office activities for the past twelve years except for the period of World War II when he served as a navigation officer with the air force. Pollard has been with the company for the past ten months in the service department. Prior to this Pollard filled several service manager positions for passenger car and truck dealerships.

Euclid Road Machinery Co., Cleveland 17, O. has established a new sales and service branch at 339 W. Maple St. in Monrovia, Calif., a suburb of Los Angeles. A. E. Sorensen, formerly manager of the company's branch at Emeryville, Calif. is manager of the new branch. Paul Hoffman is office and parts manager and B. J. Conway is in charge of service. P. A. McDonald succeeds Sorensen as manager of the branch at Emeryville. He has been transferred from Minneapolis where he was district manager since 1949 covering the Dakotas, Minnesota and parts of Iowa, Wisconsin and Michigan. W. P. Sutherland is appointed manager for this territory.

Fairbanks, Morse & Co., Chicago 5, Ill., announces the following changes in the sales organization: J. A. Cuneo, formerly manager of the Chicago branch has been promoted to the position of general sales manager. Milo C. Roy, formerly manager of the Omaha branch, has been appointed manager of the Chicago branch. J. W. Wright, formerly

"The total of the sale was excellent..."
says Mark C. Walker Jr.
Santa Ana Calif.

Forke Brothers
321 Sharp Building
Lincoln, Nebraska

Mark C. Walker & Son Co.
Contractors
Santa Ana, California

Gentlemen:

We received a letter a few days ago from a contractor who has considerable construction equipment to sell and he asked about our auction. We felt we would drop you a line to tell you once again how very pleased we were with all aspects of the sale we had at which you auctioned our equipment.

The total of the sale was excellent. The amount of money the small items and "hard to sell" pieces brought was amazing. We were very pleased with the large pieces, too, as we feel they brought just as much or more than we could have sold them for privately.

Sincerely yours,
Mark C. Walker Jr.

MORE AND MORE construction equipment owners are finding Forke Brothers' properly-conducted, well-advertised auctions get profit-boosted results, immediate action and cash at the time of sale! Mark C. Walker, Jr., is but one of many well-satisfied auction-action clients of Forke Brothers, pioneers in construction equipment auctions since 1921. Make certain you get Forke Brothers' "Plan of Auction" before disposing of ANY of your equipment. Write, telegraph or telephone.

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The Auctioneers
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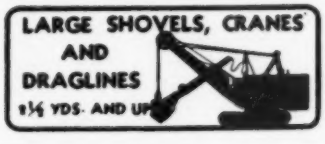
TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.



Immediate delivery P & H Model 1400 electric stripping shovel, guaranteed condition, 48 ft. boom, 34 ft. sticks, 3¾ yd. bucket, large inventory of parts.

Harmon Creek Coal Corporation
1606 First National Bank Building
Pittsburgh 22, Pennsylvania
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Marion 5480 shovel. Located in middle west. Inquire Box No. 3469, c/o EXCAVATING ENGINEER.

Two four-year-old Lima Model 780 draglines. Both equipped with 70 foot boom, 2¼ cubic yard Page bucket, Caterpillar D-17000 engine, and long crawlers. Both machines recently overhauled and in good condition.
Location, Oklahoma Box 3471

Lorain 95 dragline equipped with 75' boom, 2½ yd. bucket, D-17000 Caterpillar engine. D-7 tractor equipped with a straight blade dozer. Call EDison 5611, New Orleans, La., or write **J. Ray McDermott & Company, Inc., P. O. Drawer 38, Harvey, Louisiana.**

FOR SALE

15-B BUCYRUS-ERIE SHOVEL ATTACHMENT

Good Shape!

C. F. MALANKA & SONS, INC.
1317 Bergenline Ave. Union City, N. J.

Bucyrus-Erie Model 1030 crane with 85 foot boom and fairleads; 1-yd. capacity. Serial No. 10518, powered by Wisconsin Model B-3 gasoline engine. Power unit recently overhauled and otherwise rebuilt. Open to offer.
Box 3473

Bucyrus-Erie GA-2 No. 9764 combination shovel and crane. In good condition. Contact
G. Beemsterboer
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Pullman 5-6000

P&H Model 750 dragline and clamshell, serial 4497, 60' boom, 1¾ cu. yd. dragline bucket, oversize cats. Good operating condition. Available immediately.
Pipe Creek Stone Company
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We Specialize
On Exclusively Used
mechanically sound, late model diesel Bucyrus-Erie and Northwest shovels, cranes, draglines and pullshovels. Our list of Bucyrus-Erie 15-B's, 22-B's, 38-B's and 54-B's and Northwest 25's, 6's, 80-D's and 95 machines is the most complete and comprehensive inventory of used machines of these models available. We also list walking draglines and all attachments.
J. C. French Company
226 Berry Parkway Park Ridge, Illinois
Tel. TAcott 3-4927

Bucyrus-Erie 20-B backhoe with Cummins HB 400 diesel engine. Priced for quick sale.
Morris G. Laramie & Son, Inc.
16200 West Eight Mile Rd.
KEnwood 1-9322 Detroit 35, Michigan

Insley Model K-12 new 1947 with Chrysler gas engine, 50 ft. boom, 15 ft. jib, ½-yd. combination dragline lifting crane and backhoe, machine in good condition. Box 3466

P&H Model 255-A, new 1948 ¾-yd dragline, Waukesha gas motor with 45 ft. boom including ¾-yd. Page dragline bucket, 26 inch treads, serial Number 12676; in good condition. Box 3465

Northwest model 25; 6; 80D; 95. Manitowoc 6500; 4500 new — will rent. Bucyrus 54-B; Monighan 5W; 7W; 9W; 450.
A. W. Nevers Phone 32 Mt. Pleasant, Iowa

Bucyrus-Erie Model 15-B combination shovel backhoe. 23000 series serial number. Machine now working and represented in good condition.
D. D. Kennedy, Inc.
P. O. Box 278 Bellwood, Illinois
Phone Chicago—Estebrook 8-5223

For Sale: 23-ton La Crosse machinery trailer Model DF6T-22a with front dolly. New complete shovel attachment for Koehring Model 304.
F. H. Friede
736 N. Park St. Reedsburg, Wisconsin
Phone: 16

7000 feet shielded preassembled aerial cable, 5 KV, 2-0, 3 conductor w/copper shielded tape; used but in good condition. Corona resisting rubber insulations. Box 3474

BUCYRUS-ERIE 60 FT. BOOM, DRUM WITH STEAM RAM & LEVERS TO CONVERT 41-B STEAM SHOVEL TO CRANE WORK. DARIEN 60 E. 42nd ST. NEW YORK, N. Y.

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If you do not find the equipment you want listed in these columns, write to:
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South Milwaukee Wisconsin

Wanted: Good used Bucyrus-Erie 22-B transit crane. Give complete details in first letter.
Wm. H. Ziegler Co., Inc.
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POSITIONS WANTED

Power shovel, backhoe and excavating equipment operator. A-1 mechanic, standard makes, Bucyrus-Erie preferred. Will go anywhere. Now located at Baltimore, Maryland. Box 3472

General superintendent or superintendent available; 30 years experience and qualifications; supervising, estimating, and building all types highways, airports, heavy excavating, large sewers, earth-filled dams, levies, covering several states. Honest, sober, and reliable, know cost and equipment. Interpret plans and organizing. Box 3464

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manager of the Diesel sales division, with headquarters in Chicago, has been appointed manager of the Omaha branch. C. E. Dietle, formerly Diesel department manager of the Chicago branch, has been promoted to the position of manager of the Diesel sales division. W. B. Wylly, formerly manager of the Houston, Tex., sub-branch, has been appointed manager of the Atlanta branch. L. A. Weom, formerly manager of the St. Louis branch, has been transferred to St. Paul where he has taken over the duties of branch manager succeeding A. C. Thompson who has retired after forty-five years of service. Clifford J. Schroeer, formerly Diesel department manager of the St. Louis branch, has been promoted to manager of the St. Louis branch succeeding L. A. Weom. Gordon R. Anderson, manager of the Freeport works, has been promoted to the position of general manager of the electrical division, which includes manufacturing, as well as sales. Anderson's offices will remain in Freeport.

General Tire & Rubber Co., Akron, O., has made several changes in its sales organization. William J. Shea, Detroit branch manager, has been appointed to the manufacturers sales department with headquarters in Detroit. Shea has been with General since 1922. A native of Columbus, O., he served as manager of the Denver and Akron branches prior to being named head of the Detroit branch office in 1932. J. A. Wilson, St. Louis branch manager, has succeeded Shea as head of the Detroit office. Wilson started with the sales force at the Memphis office in 1944, becoming head of truck tire sales there in 1948. A native of Thornton, Ark., he was named St. Louis branch manager in 1949. Moving into the position of manager of the St. Louis branch to replace Wilson is H. L. Davis, Akron branch truck tire sales manager. Davis started with the Akron branch as a salesman in 1946. A graduate of State Teachers' College in Slippery Rock, Pa., Davis holds a master's degree from the University of Pittsburgh. Houston branch manager H. L. Whitesell has been transferred to a special assignment on contractor and off-the-road tires in an area covering several southern states. The sales trainer at the Atlanta branch, B. L. Crowe has taken over as manager of the Houston office. Crowe started as a salesman in the Memphis office in 1946. He is a native of Cragford, Ala., and attended the University of Alabama. Lou F. Roberts, Memphis branch manager, will become the Richmond, Va., branch manager. A native of Virginia and a graduate of V.M.I., Roberts has been with General since 1945. After four years as a salesman, he was made branch manager of the Memphis office. During World War II, Roberts was in a U. S. tank assault force in Europe. Otis D. Andrews, Atlanta branch truck tire salesmanager, has been named Memphis branch manager.

R. G. LeTourneau Inc., Peoria, Ill. has appointed Henry Cain district sales representative for Nebraska, Kansas, Missouri and southern Illinois. For the past five years Cain has been the chief representative at the company's Washington, D. C. office. Before coming to LeTourneau he attended the University of Missouri at Columbia, was with the Sinclair Refining Co. at Kansas City, operated a farm and served five years in military service as supply officer with the corps of engineers and an aviation battalion. Named acting chief Washington representative is David W. Flint, who has been with the office for the past few months. Jack McCann, former member of the advertising department, has been appointed assistant Washington representative. William Barry has been transferred to the domestic sales department from the government sales department. Darrell Abernathy succeeds Barry as special representative for the government sales department, and parts coordinating position formerly held by Abernathy is now filled by John Tuntas.

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... to make NEW steel

Steel mills use *one* ton of iron and steel scrap in making every *two* tons of open-hearth steel.

But normal sources of iron and steel scrap can't keep up with demand. That's why the steel industry asks you to collect your scrap—in the form of obsolete, worn-out machinery and parts—and send it back to the mill.

Only with *your* help can current military and civilian production demands be met.

Start *your* scrap salvage program today—call in your local scrap dealer *now*.

NON-FERROUS SCRAP IS NEEDED, TOO!

Courtesy of Excavating Engineer

This "Cat" No. 12 Motor Grader, equipped with DoMor elevating grader, is side burrowing at the rate of between 500 and 600 yards per hour.

They help speed completion of atomic project

Building access road to the Dugway Proving Grounds, south of Tinipie, Utah, the Olof Nelson Construction Company relies heavily on "Caterpillar" equipment.

"We think 'Caterpillar' products are tops," says Mr. F. F. McKinnon, Secretary-Treasurer of Nelson. "Cost of maintenance is low and they've got a long life. We have an old RD8 we were going to scrap four years ago, but it's still going strong. We get good service from our 'Caterpillar' Dealer."

Among the "Caterpillar" units on this job are three No. 12 Motor Graders—one equipped with a DoMor elevating grader. Two "Cat" D13000 Engines power a Telsmith crusher. The crusher is fed by "Cat" Diesel Tractors with 'Dozers. Nelson's lineup also includes six more D8s, a D7 and a No. 112 Motor Grader.

Concentration on "Caterpillar" equipment pays off three ways—in higher production, lower maintenance costs and simplified service problems. Good care of your units pays off, too—you get *extra* working capacity and longer life. Considering defense demands, that's mighty important today. To get the most out of your "Caterpillar" rigs, treat them right—and keep in touch with your "Caterpillar" Dealer.

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Your B & B distributor will gladly work with you to standardize on *Preformed* Yellow Strand Special Scraper Rope and to maintain a balanced supply of spares. See him, too, for long-lived hoist and drag lines.

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